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Cancer incidence and mortality in the industrial city of Sumgayit, Azerbaijan: A descriptive study

by

©

James Edward Andruchow

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of Master of Science

in

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled *Cancer incidence and mortality in the industrial city of Sumgayit, Azerbaijan: A descriptive study* submitted by James Edward Andruchow in partial fulfillment of the requirements for the degree of Master of Science in Medical Sciences – Public Health Sciences

Dedication

I would like to dedicate this thesis and the accomplishment it represents to my supervisor, Dr. Colin Soskolne. Without his mentorship, assistance, and most importantly, friendship, this work could not have been completed. Dr. Soskolne's patience and understanding have allowed me to successfully traverse a period of great turbulence and transition in my life, and helped me to discover a great deal about myself in the process. For this, I owe Dr. Soskolne an immense debt of gratitude, and I will always remain personally grateful to have known him.

Dr. Soskolne has taught me a great deal about epidemiological research and academia in general, but perhaps the most important things I have learned from him have not been academic in nature. From Dr. Soskolne I have learned the importance of friendship, seen the rewards of being meticulous and punctual, rediscovered the joy of physical fitness, the wonder of the world around me, the pride of accomplishment, the strength that comes from someone who believes in you, and above all, the power of believing in and accepting oneself. I can only hope that my life will stand as a tribute to the lessons I have learned from this amazing individual.

While society can judge the success of a man by many different standards, I believe that the best measure can be summarized in a quote I once read:

To make the world a better place
To know that even one life breathed easier
Because you have lived
This is to have succeeded.

Thank you, Colin, for allowing me to breathe easier.
You may never know the difference you have made.

Abstract

The city of Sumgayit, Azerbaijan, has been recognized by the United Nations as an "ecological disaster area" following decades of intense and unregulated industrial activity. In collaboration with a number of international agencies, the Government of Azerbaijan and local experts, this study evaluates some of the perceived negative health impacts from exposures present in Sumgayit, and, thereby contributes to the building of local capacity for epidemiological research. Cancer incidence and mortality data in Sumgayit for selected cancer sites are compared over the period 1980-2000 to several regions in Azerbaijan and abroad. While the cancer burden in Sumgayit does appear to be greater than in selected other regions of Azerbaijan, and with respect to national averages, Azeri cancer rates are not elevated in selected international comparisons. Unfortunately, it is not possible to have great confidence in cancer risk assessment in Sumgayit because of issues pertaining to data quality, completeness, and availability.

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List of Abbreviations and Nomenclature

Abbreviation	Full Name
Azeri	Azerbaijani
BMI	Body Mass Index
CAR	Central Asian Republics
CCS	Canadian Cancer Society
CIA	Central Intelligence Agency (United States)
CIS	Commonwealth of Independent States
EMFs	Electromagnetic Fields
EU	European Union
GDP	Gross Domestic Product
HDI	Human Development Index
HFA	Health For All Database (World Health Organization)
IARC	International Agency for Research on Cancer
ICD-9	World Health Organization International Classification of Diseases (9^{th} Revision)
IDP	Internally Displaced Person
IMF	International Monetary Fund
MIR	Mortality:Incidence Ratio
MOH	Azerbaijan Republic Ministry of Health
NEAP	Azerbaijan Republic National Environmental Action Plan
NGO	Non-Governmental Organization
NIS	Newly Independent States
PAHs	Polycyclic Aromatic Hydrocarbons
PIR	Proportional Incidence Ratio
PMR	Proportional Mortality Ratio
RR	Rate Ratio
SCE	Azerbaijan Republic State Committee on Ecology and Control of Natural Resources Utilization
SCER	Sumgayit Centre for Environmental Rehabilitation
SCS	Azerbaijan Republic State Committee on Statistics
SIR	Standardized Incidence Ratio (Same as Standardized Morbidity Ratio)
SMR	Standardized Mortality Ratio
TWA	Time Weighted Average
UN	United Nations
UNDP	United Nations Development Programme
UNIDO	United Nations Organization for Industrial Development
UNOPS	United Nations Office for Programme Services
USD	United States Dollars
WHO	World Health Organization

Chapter 1: Background and Overview

1.1. Republic of Azerbaijan

All information presented in this section is gleaned from the 2002 CIA World Factbook Online (CIA 2002).

The Republic of Azerbaijan is a relatively young nation, having gained independence from the former Soviet Union in 1991. It is located in the Caucasus region of western Asia (40 30 N, 47 30 E) (Figure 1.1). The nation is geographically small, with an area of 86,600 square kilometres, and a population of just over 8 million persons. Azerbaijan is bordered to the north by the Russian Federation, to the west by Georgia and Armenia, and Iran to the south. The eastern border of Azerbaijan is formed by over 700 km of coastline on the Caspian Sea.

Nearly half of the nation's population is concentrated in three cities: Baku, Ganja, and Sumgayit (Figure 1.2.). Baku is the nation's capital, and a major shipping port on the Caspian Sea, with a population of approximately 2 million persons. Ganja is the nation's second largest city with a population of more than 300,000 persons, located in the west of the country. Sumgayit is the third largest city in Azerbaijan, having a population of slightly less than 300,000 and is located approximately 30 km northwest of Baku on the Absheron Peninsula. The remainder of the residents are dispersed primarily among rural areas. Climate varies considerably between regions, though the Absheron Peninsula region can be characterized as dry subtropical (NEAP 1998).

Figure 1.1. Geographical location of Azerbaijan in the Caucasus region of western Asia.

Map No. 3761 Rev. 2 UNITED NATIONS
February 1998

Department of Public Information
Cartographic Section

Figure 1.2. Map of the Republic of Azerbaijan denoting study regions.

Following independence from the USSR, economic problems have plagued the country. The loss of export markets for Azeri goods within the former Soviet Union and disappearance of external funding have resulted in widespread unemployment (~20%) and poverty in recent years. At present, the main exports of the nation are cotton, oil, and natural gas. Azerbaijan continues to develop its large energy reserves through partnerships with foreign corporations; future prosperity will depend largely on the success of such developments. Unfortunately, economic development has been hindered by an ongoing armed conflict with Armenia over the Nagorno-Karabakh region. Azerbaijan has lost nearly 20% of its former territory and has been burdened by supporting approximately 750,000 refugees and internally displaced persons (IDPs) as a result of this conflict.

The population of Azerbaijan is composed primarily of Turkic Muslims, with the Azeri ethnic group accounting for over 90% of the total population, while most other persons are of Dagestani, Russian or Armenian descent. Religious affiliations in the country tend to be nominal. Life expectancy at birth for males is 67.9 years, and 75.0 years for females. Average fertility rates are 2.24 children born per woman (Azerbaijan National Human Development Report 1999, UNDP). Literacy rates are very high (~97%) attributable to the Soviet-style education system. Azeri is the official language, though Russian remains pervasive, particularly among the educated. Azerbaijan's Human Development Index (HDI) score in global comparison is shown in Table 1.1.

Table 1.1. Azerbaijan's Human Development Index in global comparison (Adapted from Azerbaijan National Human Development Report 1999, UNDP).

Region	HDI	Life expectancy index	Education index	GDP index
Azerbaijan	0.695	0.75	0.88	0.46
Eastern Europe and CIS	0.754	0.73	0.91	0.63
Industrialized countries	0.919	0.88	0.96	0.91
World	0.706	0.69	0.73	0.69

Water quality in the nation is poor, and the majority of the population does not have access to safe drinking water. Approximately 80% of the population does not have the use of modern sewage and sanitation systems. The main freshwater sources of the nation are the Kura and Araks rivers, both seriously contaminated with a number of domestic, agricultural, and industrial pollutants, from within the nation and from the neighbouring countries of Armenia and Georgia. The Caspian Sea has also been severely polluted, and now faces a number of serious ecological issues.

Air quality in the nation remains poor, with decreases in industrial air pollution in the past decade being offset by increased emissions from the transportation sector. Of eight cities monitored for ambient air pollution by the State Committee on Ecology and Nature Utilization Control (SCE), five account for 96% of pollutant output. Included among these five are the study cities Baku, Sumgayit, and Ganja. Soil quality has been adversely affected by salinization, and erosion by both wind and water. Industrial wastes are known to contaminate over 60,000 hectares of land.

Many scientists recognize the Absheron Peninsula of Azerbaijan as one of the most severely polluted regions on the planet (Azerbaijan National Human Development Report 1999, UNDP). Decades of oil production, intensive industrial and agricultural development in the region, coupled with an almost total neglect for environmental protection, have resulted in serious pollution to the air, water, and soil (SCE 1998). Though steps are being taken to address these and many other environmental issues, significant progress has not yet been made, in large part owing to the scale of the problems. The success of these and other projects will be dependent to a large extent on continued funding from international donors, further strengthening of local capacity to plan and conduct research projects, and on economic development in the country.

1.2. City of Sumgayit: Past and Present

The city of Sumgayit was founded as a major industrial production centre for the former USSR. The area was chosen largely for its geographic characteristics: a favourable climate, flat topography conducive to building large-scale industrial facilities, and proximity to both a large freshwater supply and the Caspian Sea (Imanov 1997). Industrial development began in the early 1940s with the creation of a thermal power generating station, and groundbreaking for the pipe-rolling, synthetic rubber, and several other chemical plants. Though World War II delayed development, soon after its resolution massive investment into the area resumed. Because of its rapid growth, Sumgayit was given city status in 1949.

A policy of intensive industrial development persisted into the 1980s without an "official" concern for environmental and occupational safety standards. Priority in the former USSR was placed on maximizing production, rather than environmental or occupational health, and consequently the environment bore the consequences of this unregulated development (Jedrychowski *et al.* 1997). This is of great concern, especially considering that during peak production, Sumgayit produced 85% of the USSR's chemical and petrochemical needs. The Sumgayit Centre for Environmental Rehabilitation, as part of a UNDP project, has collected substantial amounts of data

describing Sumgayit industry. Unfortunately, production and waste data for Sumgayit are difficult to obtain, and generally incomplete (Makhmudov & Asadov, *pers. comm.*). However, they do provide some insight into the scale of Sumgayit industry. At peak production in the mid-1980s, more than 40 large factories occupying an area of over 3,000 ha were actively producing a wide variety of chemical and industrial products (Tables 1.2, 1.3). The results of this development were decades of severe environmental and occupational pollution (Table 1.4), which culminated in ecological disaster for the city. The relative locations of Sumgayit and Baku and several major municipal and industrial pollution discharge sites on the Absheron Peninsula are identified in Figure 1.3.

Reports of negative human health effects in Sumgayit accumulated over time, but many plants continued to operate despite their high pollutant output. In the late 1980s, several plants ceased operation, officially owing to losses of input and output markets, although allegations persist that the factories were closed in response to serious human health concerns. Still, it was not until the early 1990s that the collapse of the Soviet Union and the disappearance of export markets and economic ties within the USSR led to the closure of most factories in many republics of the former USSR (McKee *et al.* 2002). While having the positive effect of putting an end to the decades of pollution, the stoppage of production resulted in severe economic strife for the city, with widespread unemployment and financial problems. With a local economy relying almost entirely on industry, Sumgayit was devastated. The economic problems, when combined with the looming environmental disaster in the early 1990s became known as the "Sumgayit Crisis."

Owing to the dire economic situation in the country, the Government of Azerbaijan found itself alone unable to address the serious issues present in Sumgayit. In 1994, Azerbaijan approached the international community, and made the extent of the problems in the city known to the world. The area was declared an "ecological disaster zone," and with the assistance of development agencies, plans were developed to facilitate the economic and environmental rehabilitation of the city.

Table 1.2. Sumgayit factories and their major products, circa 1980[1].

Factory Name	Major Products
AZERBORU Tube Rolling Factory	Iron pipes and tubes, seamless steel tubes
AZERIT Building Materials Company	Light fillers and bentonite powder
Compressors Factory	Compressor manufacture
Consumer Goods and Lacquer Paint Factory	Lacquers, paints, bed linen, towels, clothing
Electrical Equipment Factory	Non-standard electrical equipment, instruments
EP300 Plant	High pressure polyethylene, ethylene, propylene
Glass Factory	Flat, cambered, and shaped glass
Iron-Concrete Factory No. 1	Iron-concrete industrial construction materials
Iron-Concrete Factory No. 1	Concrete tiles, flooring, flat and corrugated slabs
Mechanical Repair Plant	Repair of lead and nickel equipment, and chemical equipment
Metal Container Factory	Metal casks, drums, cans, containers for shipping and storage
Oil Additives Factory	Additives for lubricating oils: EkhP-10, EkhP-21, BFKU, and technical formaldehyde
Organic Synthesis Factory	Simple polyester, propylene oxide, epoxy resin, dichloroethane
Outwear Knitting Factory	Knitted clothing for men, women, children
Polymer Construction Materials Factory	Adhesives, linoleum flooring, adhesive wallpaper, and polystyrene foam
Rally Company	Linseed oil, putty, paint, candles, soap
Sanitary Engineering Works	Plumbing and ventilation
Sanitary Supplies Factory	Sanitation and ventilation equipment, polyethylene, steel, iron cast and non-ferrous tubes
Sumgayit Aluminum Smelter	Aluminum in pigs and ingots
Sumgayit Sewing Factory	Women's clothing
Sumgayit Yam Spinning Factory	Acrylic thread for knitting factories
Superphosphate Factory	Superphosphate, sulphuric acid, ultra marine, liquid glass, anti-corrosion materials, alum, anti-inflammatory powder, and aluminum sulphate
Surfactant Factory	Chemicals: liquid chlorine, sulphanol, chloric paraffin, sodium carbonate, consumables, carboxymethylcellulose
Synthetic Detergent Company	Powder detergent, sodium silicate, liquid detergent, industrial shampoos, industrial cleaners and soap, shoe polish, dish-washing products, shine-drying products
Synthetic Rubber Plant	Rubber, latex, latex products, isopropyl alcohol, adhesives, synthetic rubber, ethylene, petroleum-based solvents, caustic potash, agricultural products, sodium carbonate, sodium acid carbonate, soda, chlorine, calcium acetylsalicylate, sulphanol, palatone, potassium, & shine-drying products
Thermal Insulation Company	Insulation
Weaving Factory	Cotton and woollen fabric
Wood Processing Factory No. 1	Carpentry, joinery, wooden doors and windows

[1] All data presented here were obtained from the UNDP-funded Sumgayit Centre for Environmental Rehabilitation.

Table 1.3. Annual gross output of Sumgayit industry for selected products (1986-1998).

Product	Annual Production (Thousands of Tonnes per Year)												
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Aluminum	N/A	N/A	54.0	36.0	24.8	21.1	18.6	13.6	7.8	1.3	1.7	4.8	3.6
Aluminum chloride	3.2	2.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,3-Butadiene	N/A	N/A	34.3	29.2	15.1	22.8	6.2	3.0	N/A	0.0	0.5	0.6	0.2
Butadiene-styrene latex	N/A	N/A	90.2	80.9	60.4	54.9	11.5	5.7	0.0	1.5	0.9	0.1	0.4
Chlorine liquid (diaphragm method)	5.5	5.2	5.0	4.6	2.7	2.6	1.3	4.5	1.9	2.8	1.7	1.0	N/A
Dichloroethane	12.8	12.5	13.0	13.5	12.6	12.0	0.1	5.2	5.9	5.8	3.5	N/A	N/A
Ethylene	N/A	N/A	1036.0	143.7	83.5	103.5	8.6	31.5	235.6	31.0	38.8	18.5	21.3
Ethylene chlorohydrin	24.3	24.9	23.0	18.9	13.3	13.3	3.9	4.3	2.9	1.8	0.4	N/A	N/A
Isopropyl alcohol	N/A	N/A	28.8	27.1	21.8	21.0	37.4	3.7	N/A	10.2	14.2	11.5	8.3
Mercury	4.0	4.3	5.3	5.7	5.5	0.6	4.6	2.9	2.4	1.4	7.0	6.7	2.6
NaOH, mercurial method	7.2	7.1	7.3	7.5	7.2	7.8	6.5	4.1	3.5	2.6	1.9	1.9	1.0
Polyethylene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13.1	20.4	28.6	15.7	16.6
Sulphanol, 1st order	7.6	7.4	6.9	6.5	6.6	5.2	3.0	7.3	N/A	N/A	N/A	N/A	N/A
Sulphanol, 2nd order	6.7	6.7	7.2	7.0	6.5	6.6	3.2	1.6	6.5	0.3	0.3	0.4	0.0
Styrene	N/A	N/A	35.5	29.2	25.4	22.9	8.7	2.3	1.0	N/A	N/A	N/A	N/A
Total Production	78.5	77.8	1376.3	418.7	289.9	299.7	115.9	98.1	286.5	92.9	106.4	73.4	55.7

Note: Cells classified as "N/A" refer to those data that were unable to be obtained by the staff at the Sumgayit Centre for Environmental Rehabilitation.

Table 1.4. Annual gross waste output of Sumgayit industry for selected waste products (1988-1997).

Waste Product	Annual Waste Production (Tonnes per Year)									
	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Ammonia	N/A	N/A	2309.8	2058.6	814.0	289.8	153.2	39.4	5.7	
Benzene (petrolic, low-sulphur)	N/A	N/A	238.6	25.9	31.8	3976.5	368.6	108.2	45.6	18.7
Carbon monoxide	14107.5	18670.3	11027.4	9171.1	4965.0	4519.0	2521.9	3442.3	1750.0	5563.3
Chlorine	365.2	406.6	250.1	218.5	0.0	99.9	34.8	40.4	28.7	N/A
Dichlorethane	N/A	N/A	0.3	0.4	N/A	0.1	0.1	0.0	N/A	N/A
Ethyl acetate	N/A	N/A	8.8	N/A	10.9	10.1	6.7	4.7	4.7	N/A
Fluoric compound (anhydrous HF, SiF_4)	1670.6	934.1	1053.4	1044.5	435.9	222.6	36.6	1782.9	113.2	37.2
Formaldehyde	N/A	N/A	18.4	N/A	6.0	0.0	4.2	2.0	2.6	N/A
Chromium (VI)	N/A	N/A	249.1	259.4	0.1	0.1	0.0		0.0	N/A
Hydrocarbons (without VOCs)	12165.3	11779.5	40087.1	40851.0	1321.8	5744.5	757.6	416.6	281.4	0.1
Hydrogen chloride (HCl)	0.0	N/A	468.2	425.6	357.5	68.2	48.5	9.6	9.9	3.7
Isopropyl alcohol	N/A	N/A	91.7	53.6	N/A	N/A	N/A	N/A	N/A	N/A
Mercury	N/A	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Nitric oxide	11869.3	12853.1	10915.6	10527.0	3200.7	6643.9	6477.0	10219.1	3441.0	2627.1
Phenol	N/A	N/A	3.9	17.2	1.3	N/A	0.2	0.0	N/A	N/A
Solid wastes	11940.5	12320.2	8528.7	8188.9	6304.7	4216.3	763.0	3237.6	549.7	3964.1
Soot	N/A	N/A	4.5	3.0	8.8	N/A	N/A	N/A	275.2	443.8
Styrene	N/A	N/A	1822.2	1198.1	159.4	2.8	0.7	0.2	0.3	N/A
Sulphur dioxide	15319.4	16304.2	13010.1	9029.0	4168.4	10633.6	6361.9	5917.8	3703.8	3255.4
Sulphuric acid (H_2SO_4)	8.8	8.7	8.8	308.9	167.7	52.5	31.9	16.6	21.1	28.9
Toluol	N/A	N/A	2.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vanadium oxide (V_2O_5)	N/A	N/A	24.2	12.9	0.8	18.4	10.3	N/A	8.1	8.8
Volatile organic compounds (VOCs)	N/A	N/A	8159.6	8135.4	302.7	274.9	1330.6	11714.2	12470.4	1728.4
Xylenes	N/A	N/A	1.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Other gaseous and liquid substances	2624.8	3427.9	4726.0	3437.5	1910.2	568.7	234.9	126.5	127.6	263.0
Other substances	N/A	N/A	785.6	54493.3	13470.3	388.3	8583.6	12914.1	668.4	163.4
Total	70071.4	76704.7	103795.5	149459.8	37638.2	37731.0	27733.1	49994.3	23510.5	18105.9

Note: Cells classified as "N/A" refer to those data that were unable to be obtained by the staff at the Sumgayit Centre for Environmental Rehabilitation.

Figure 1.3. Map of the Absheron Peninsula denoting relative positions of Baku and Sumgayit, as well as major municipal and industrial waste discharge sites (adapted from SCE 1998).

1.3. International Involvement

In the mid-1990s, the Government of Azerbaijan approached the UNDP for its support in rehabilitating the economic and environmental situation in the city of Sumgayit. The possibility of establishing a special economic zone in Sumgayit was sought to regenerate its industrial activities through direct foreign investment. By August 1995, an agreement was signed between the Government of Azerbaijan, the UNDP, and the United Nations Industrial Development Organization (UNIDO), to promote the economic and ecological rehabilitation of Sumgayit. To address the environmental concerns, UNDP was requested to launch a project in the city aimed directly at environmental rehabilitation.

The UNDP project, Environmental Rehabilitation of Sumgayit, was signed by the Government of Azerbaijan, UNDP, and the United Nations Office for Project Services (UNOPS) in 1997, and its implementation commenced the following year. The primary objective of the project was to establish the Sumgayit Centre for Environmental Rehabilitation (SCER), which would serve the local population by empowering them in their community effort to improve their living environment and to provide environmental information and services to potential investors regarding the industrial operation of Sumgayit. The WHO also has been involved in implementing the public health component of the project.

The SCER has been active in several ways: collecting and disseminating data on Sumgayit industry in relation to human and environmental health, providing assistance in the assessment of potential environmental and health impacts from new investments, and in remediation, renovation, and clean-up activities to be carried out at the former production sites. The staff of the SCER, and the work they have already completed, have contributed greatly to the conduct of this study.

Assistance has been obtained from both the International Monetary Fund (IMF) and the World Bank in stabilizing the Azeri economy and smoothing the transition of the country to a market economy. One of the initiatives, begun in cooperation with the World Bank,

has been the elaboration of a National Environmental Action Plan (NEAP) designed to identify, monitor, and address many of the nation's severe environmental problems (SCE 1998). Many other proposals have resulted from similar international collaborations, and will continue to be important in the economic and environmental rehabilitation of the area, including the development and implementation of a National Environmental Health Action Plan (NEHAP), which identifies key priorities and issues in relation to environmental health and sets-up an implementation plan to ensure progress on the identified priorities.

Some plants in Sumgayit continue to operate, though the industrial facility as a whole is now working at only 10-15% of its former production capacity (SCE 1998). Efforts are underway to return many of the industrial facilities back to full production with modern safety and pollution standards, though the necessary financial investments to do so have not yet been secured. The toxic legacy from decades of unregulated pollution remains and, despite active remediation efforts, will likely persist for many years into the future.

Chapter 2: Rationale and Study Objectives

2.1. Rationale

This study was conceived during the conduct of joint UNDP & WHO-sponsored Introductory and Advanced Environmental Epidemiology training courses in Baku during February and December of 2000, respectively. During their stay in Azerbaijan, two of the course instructors, Colin Soskolne and Francesca Racioppi, had the opportunity to visit the UNDP-funded Sumgayit Centre for Environmental Rehabilitation.

While examining the pollution data collected by the Sumgayit Centre, Dr. Soskolne and Ms. Racioppi recognized the long-term environmental and occupational exposures plaguing Sumgayit. Furthermore, they were able to examine some cancer data for the city of Sumgayit, which appeared to show higher than expected rates of cancer. Given the potential link between high degrees of environmental and occupational pollution and increased cancer burden in the city, a study examining the cancer experience in the city of Sumgayit was proposed. The study was meant to be an attempt to confirm or deny, based on available evidence, the perceived increased health risks resulting from past and present industrial activities in the city, by examining the disease burden in the local population. The conduct of such a study was seen also as providing practical training as an extension of the UNDP/WHO courses whose primary purpose was to build local capacity in environmental epidemiology research.

2.2. Study Objectives

This study has several key and overlapping objectives. The primary goal of this study is to provide a quantitative, evidence-based assessment of perceived negative health effects in the city of Sumgayit resulting from decades of intense and unregulated pollution. Public fears persist that high levels of exposure to a number of toxic substances generated by Sumgayit industry have compromised human health. However, no scientific studies have yet been conducted to examine these concerns.

Evidence is needed to support government and policy makers in setting priorities for allocating resources and for designing public health intervention programmes. Determining if Sumgayit carries an additional cancer burden as a result of past and present industrial activities would provide an evidence-based assessment to support or dismiss the widely held perception that industrial pollution negatively impacted the health of Sumgayit residents.

This study aims to provide the residents of Sumgayit, as well as the Governments of Sumgayit and Azerbaijan, with factual information relating to the perceived health risks associated with exposures from Sumgayit industry. The results of this study will provide a basis for recommending public health interventions, and/or further research, including secondary and tertiary prevention programmes and possible case-control studies.

A second major objective of this project is to build local capacity for epidemiological research by acting as a practical extension of the UNDP/WHO-sponsored Environmental Epidemiology courses conducted in Baku during February and December of 2000. The conduct of this study involved hands-on participation in epidemiological research by several local Azeri professionals who attended the WHO courses, providing them an opportunity to learn first-hand about the practical conduct of epidemiological research. It is hoped that through their involvement in this study they have gained the skills necessary to propose and conduct original epidemiological research. Such trained local researchers would be invaluable to advancing public health in Sumgayit, and in Azerbaijan as a whole.

Occupational health research, and in particular, the study of occupational cancer, have traditionally been lacking in developing countries (Taba 1981). In a 1992 paper, Mati Rahu specifically addresses the need to conduct cancer epidemiology research in the heavily polluted regions of the Soviet Union (Rahu 1992). By demonstrating the ability to successfully conduct health research in Azerbaijan through this pioneering study, future investment in health research in this nation will be encouraged, helping to address this important topic of research.

All cancer data collected during this study will be computerized and provided to the Azerbaijan Republic Ministry of Health to aid construction of health information systems, including a national cancer registry database and expansion of the Azerbaijan Republic Ministry of Health Mednet Website (www.mednet.az). Improvement of Azerbaijan's health information system will be of vital importance to future health policy making and research, enabling the delivery of the best possible health care to its citizens.

Finally, the methods used in this study and the practical experience gained in its conduct are intended to be used as a basis for developing case-study-based and problem-solving training material for students in medical schools, addressing the key aspects that investigators have to contend with when planning and carrying out longitudinal epidemiological studies based on historical data sets.

2.3. Hypothesis

This study evaluates the perceived increased cancer burden from long-term environmental and occupational pollution in the city of Sumgayit, relative to selected other regions of Azerbaijan. If Sumgayit has suffered an increased cancer burden, cancer incidence and mortality rates will be higher in Sumgayit than in other regions. Therefore, the study's null hypothesis is as follows:

Cancer incidence and mortality rates in the city of Sumgayit over the period 1980-2000 do not differ from those of:

1) Other selected regions of Azerbaijan (Ganja, Lenkoran-Astara)
2) Azerbaijan national data
3) The Caucasus nations of Georgia and Armenia
4) Canada

Chapter 3: Literature Review

3.1. Environmental Carcinogenesis

The occurrence of cancer in humans has long been associated with exposures to substances existing in the environment. However, even in the absence of all exogenous influences, human populations would still likely experience a certain level of cancer, or background incidence. Current estimates by scientists suggest this background incidence rate would be very small, probably less than 5% of currently observed rates (Nasca and Pastides 2001). If one then assumes that the causation of the remainder of cancers has some external component, more than 90% of all cancers observed at present are environmentally-caused, at least to some degree.

When one considers the term "environment" in its broadest sense, it includes such diverse factors as lifestyle and cultural practices, as well as occupational and ambient exposures. Yet, when considering environmental carcinogenesis, it is more common to envision only a small portion of these exposures, particularly man-made chemicals and other pollutants in the ambient or occupational environment.

Many studies have focused on evaluating a myriad of hypothesized environmental carcinogenic agents present in low doses, including water chlorination and its by-products, air pollution, and other ambient exposures (Cantor 1997, Katsouyanni & Pershagen 1997, Kheifets 2001, Boffeta *et al.* 1997). The results of such studies have been inconclusive at best. Researchers have even attempted to relate industrialization *per se* to cancer risk (Ward *et al.* 1997), though the association is difficult to assess, particularly given the association of various confounding lifestyle factors with industrial development (Higginson 1993).

Many commentators have taken increases in certain cancers over the past several decades as evidence of the negative health effects that ambient environmental exposures are exerting. However, three exposures in particular are responsible for the bulk of the

increases in cancer rates, namely tobacco usage, dietary factors, and asbestos exposure (Higginson, Muir & Munoz 1992). In fact, in terms of cancer deaths, tobacco use may be attributable for 30%, and diet may account for 35% of total cancer mortality (Higginson 1993). Though occupational exposures are responsible for a comparatively small proportion of the overall cancer burden, likely less than 10% (Roe 1985), there are a number of reasons why occupational carcinogenesis deserves special attention.

3.2. Occupational Carcinogenesis

What may be the most compelling reason to study occupational cancer is the fact that cancers resulting from occupational exposures are completely preventable. Occupational exposures are man-made and, as such, are controllable. For this reason, any level of cancer attributable to occupational factors should be seen as unnecessary. Given that many of these exposures are easily avoidable with the utilization of newer technologies, appropriate safety equipment and protocols, much of the cancer burden attributed to such sources can be effectively prevented. Unfortunately, such preventative measures have been adopted to any significant extent only in the richer industrialized nations.

In contrast, less affluent nations such as Azerbaijan historically suffer from a number of characteristics that increase the vulnerability of their populations to occupational carcinogenesis. Seven such conditions have been identified by Taba (1981): 1) a paucity of quality worker health legislation; 2) absence of enforced exposure thresholds to toxic substances; 3) insufficient investment in occupational health workers; 4) poor reporting of occupational diseases; 5) lack of epidemiological understanding of occupational exposure and health relationships; 6) low level engineering guidelines; and 7) inadequate occupational health training in agencies monitoring workplace health conditions. To this list might be added: a lack of occupational safety training, poor worker awareness of hazards, absent or ineffective personal protective equipment, and a disposition of occupational medicine still oriented toward the diagnosis and certification of occupational diseases (mainly for compensation purposes), rather than towards their prevention. Because many of these issues were known to be present in Sumgayit

industry, we may suspect *a priori* that Sumgayit residents suffer from an excess cancer burden. Furthermore, the socioeconomic stresses suffered by the population of the former Soviet Union in the years following its dissolution (Leon & Shkolnikov 1998, Notzon *et al.* 1998) may have exacerbated the influence of exposures, and resulted in more severe human health effects than would otherwise be expected.

Several facts further support the perception that the residents of Sumgayit are at increased risk of developing cancer. The International Agency for Research on Cancer (IARC), an agency of the WHO, is an organization whose purpose is the research and prevention of cancer. One of its many functions has been the development of the IARC Monographs Programme on the Evaluation of Carcinogenic Risks to Humans, a database summarizing available scientific research on potential carcinogenic exposures; its function is to classify exposures in terms of carcinogenicity to humans on the basis of current published evidence.

IARC has devised a carcinogenicity classification scheme in which exposures can be categorized into one of five different groups (IARC Website). IARC Group 1 carcinogens are those agents for which sufficient human and/or animal experimental evidence exists to enable their classification as definitive human carcinogens. Substances in Group 2 are further divided into two separate categories, those in Group 2A being probable human carcinogens, and those in Group 2B are possible human carcinogens. Agents classified in Group 3 do not have sufficient evidence available for conclusions to be made. Finally, Group 4 exposures are those probably not carcinogenic to humans.

A number of IARC-classified Group 1 definitive human carcinogenic agents have been identified in the various production facilities of Sumgayit, including benzene, ethylene oxide, and occupational exposure to strong-inorganic-acid mists containing sulphuric acid, isopropyl alcohol production and rubber manufacturing. Adding to health concerns is an extensive list of many other probable and possible human carcinogenic exposures present in Sumgayit industry (Table 3.1). Exposure to agents classified as probable and possible carcinogens may be equally hazardous because many of these compounds may

eventually be classified as definitive carcinogens, and are not so at present only because research is lacking.

Epidemiology has long been concerned with the association between occupational exposures and cancer, and for good reason; there are several advantages to studying cancer in an occupational setting. Unlike many other situations, detailed exposure histories can often be created for individuals by reviewing their work record. Precise data on the number of hours exposed, the exact type of exposure, quantitative estimates of the levels of particular exposures, and the mechanisms of exposure can often be obtained. Exposures are generally more intense than those experienced in the ambient environment, increasing the likelihood of differences between exposed and non-exposed groups (Jensen and Lynge 1984). Finally, persons working with chemicals that may be carcinogenic are more often willing to participate in research than persons sampled from the general population owing to a vested interest in their own health.

In practice, epidemiology takes advantage of the "natural experiment." The Sumgayit experience provides a unique opportunity to study the relationship between occupational exposures and cancer because people remained in stable jobs with intense exposures for many decades and there was a large diversity of exposures experienced. Thus, the city of Sumgayit represents a particularly useful natural experiment for epidemiological study.

Table 3.1. Listing of IARC-classified known and potential carcinogens present in Sumgayit industry.

Agent	IARC Monographs Listing	CAS No.	*Group	Primary Associated Cancers	Monograph Reference		
					Vol.	Year	Page
Arsenic	Arsenic and arsenic compounds	7440-38-2	1	Skin, lung, gastrointestinal, liver	Suppl 7	1987	100
Benzene	Benzene	71-43-2	1	Leukemia	Suppl 7	1987	120
Butadiene	Butadiene	106-99-0	2A	Leukemia, lymphoma	71	1999	109
Butadiene-styrene latex	Styrene, polystyrene & styrene-butadiene copolymers	9003-55-8	3	None listed	19	1979	231
Carbon tetrachloride	Carbon tetrachloride	56-23-5	2B	Non-Hodgkin's lymphoma	71	1999	401
Chloroform	Chloroform	67-66-3	2B	Multiple unconfirmed	73	1999	131
Chloroparaffin	Chlorinated paraffins	Multiple	2B	Multiple unconfirmed	48	1990	55
Chrome (hexavalent)	Chromium (VI)	Multiple	1	Lung, sinonasal cavity	49	1990	49
Dichloroethane	1,2-dichloroethane	107-06-2	2B	Brain, lymphohematopoietic	71	1999	501
Dichloropropane	1,2-dichloropropane	78-87-5	3	None listed	71	1999	1393
Ethylene	Ethylene	74-85-1	3	None listed	60	1994	45
Ethyl benzol	Ethylbenzene	100-41-4	2B	None listed	77	2000	227
Ethylene oxide	Ethylene oxide	75-21-8	1	Lymphatic, hematopoietic	60	1994	73
Formaldehyde	Formaldehyde	50-00-0	2A	Nasopharynx	62	1995	217
Freon	Chlorodifluoromethane	75-45-6	3	Lung (inconclusive)	Suppl 7	1987	149
Hydrazine	Hydrazine	302-01-2	2B	None listed	71	1999	991
Hydrochloric acid	Hydrochloric acid	7647-01-0	3	Lung, larynx	54	1992	189
Hydrogen peroxide	Hydrogen peroxide	7722-84-1	3	None listed	71	1999	671
Hypochlorite	Hypochlorite salts	Multiple	3	None listed	52	1991	159
Kerosene	Fuel Oils (Heating Oils)	Multiple	3	Skin	45	1989	239
Lindane	Hexachlorocyclohexanes	58-89-9	2B	Leukemia	Suppl 7	1987	220
Mercury	Mercury and mercury compounds	Multiple	3	Lung, brain	58	1993	239
Phenol	Phenol	108-95-2	3	Lung	71	1999	749
Polyethylene	Ethylene and polyethylene	9002-88-4	3	None listed	19	1979	157
Propylene oxide	Propylene oxide	75-56-9	2B	None listed	60	1994	181
Soot	Soots	None listed	1	Skin, lung	Suppl 7	1987	343

(Continued on next page)

Table 3.1. (Continued). **Listing of IARC-classified known and potential carcinogens present in Sumgayit industry.**

Agent	IARC Monographs Listing	CAS No.	*Group	Primary Associated Cancers	Monograph Reference		
					Vol.	Year	Page
Styrene	Styrene	100-42-5	2B	Lymphatic, hematopoietic	60	1994	233
Sulfurous anhydride	Sulfur dioxide and some sulfites, bisulfites, and metabisulfites	7446-09-5	3	Stomach, lung	54	1992	131
Toluene	Toluene	108-88-3	3	Multiple unconfirmed	71	1999	829
Trichloroethane	1,1,1-trichloroethane	71-55-6	3	Multiple unconfirmed	71	1999	881
	1,1,2-trichloroethane	79-00-5	3	Multiple unconfirmed	52	1991	337
Xylene	Xylenes	Multiple	3	Brain, lymphoma	71	1999	1189
Zeolite	Zeolites other than erionite	1318-02-01	3	None listed	68	1997	307
Exposure Circumstance							
Aluminum production	Aluminum production	None listed	1	Lung, bladder	Suppl 7	1987	89
Iron founding	Iron and steel founding	None listed	1	Lung, multiple others	Suppl 7	1987	224
Isopropyl alcohol	Isopropyl alcohol manufacture	None listed	1	Larynx, sinuses	Suppl 7	1987	229
Petroleum refining	Occupational exposures in petroleum refining	None listed	2A	Multiple	45	1989	39
Rubber industry	The rubber industry	None listed	1	Bladder, multiple others	Suppl 7	1987	332
Sulfuric acid	Occupational exposures to mists and vapours from sulphuric acid and other strong inorganic acids	7664-93-9 7446-11-9 8014-95-7	1	Larynx, lung, sinus	54	1992	41
Wood processing/furniture manufacture	Furniture and cabinet making	None listed	1	Lung, multiple others	Suppl 7	1987	380

***Key to IARC Group Classification:**

1 = Definitive human carcinogen
2A = Probable carcinogen
2B = Possible carcinogen
3 = Not classifiable at this time
4 = Probably not carcinogenic to humans

3.3. Lifestyle Factors and Cancer

Because they exert a profound influence on cancer risk in human populations, lifestyle factors have received a great deal of attention in the literature. Lifestyle factors are those characteristics describing individual choice and behaviour in humans, many of which can affect the risk of carcinogenesis. Everyday behaviours, such as sunbathing, smoking, and alcohol consumption have been linked just as conclusively to certain cancers as well known chemical carcinogens such as benzene and asbestos. However, because many of these risk factors have a social or cultural basis, and in many cases are also related to socioeconomic factors such as income, they may be difficult to change at the population level. Several of the most important lifestyle factors that have been identified influencing cancer risk are tobacco smoking, alcohol consumption, and diet (Doll & Peto 1981b).

It is unlikely that any single exposure has received as much attention in the epidemiologic literature as tobacco smoking. Tobacco usage has been identified conclusively as a cancer risk factor, but what makes it of particular concern is its extremely high prevalence in the overall population relative to other carcinogenic exposures. Current estimates identify smoking as being responsible for approximately 90% of all lung cancer mortality (Hecht 1999), the second leading cause of death in North American men.

Smoking is associated with cancer at a number of anatomical sites, including the upper respiratory and digestive tracts, pancreas, and lower urinary tract (Hecht 1999). Although associations are hypothesized between smoking and leukemia, stomach, liver, and reproductive cancers, current data are inconclusive. Yet, despite the plethora of epidemiological research documenting its negative health impacts, smoking prevalence remains high in many parts of the world. Considering that smoking is a strong risk factor for many cancers, particularly those of the lung, larynx, and bladder, it is imperative that cancer epidemiologists consider tobacco smoking, as well as other strong and prevalent risk factors as potential confounders during experimental design (Rothman *et al.* 1980).

Although exposures to tobacco smoke tend to be of considerably lower intensity through passive rather than active means, evidence exists to suggest that passive smoke exposure represents a cancer risk (Adlkofer 2001). In fact, the designation of "definitive human carcinogen" has also been extended to passive environmental (sidestream) tobacco smoke by the American Environmental Protection Agency. Smokeless tobacco (chewing tobacco and snuff) has been linked to oral cancers (Winn 1988). Furthermore, risk of cancer from combined exposures to tobacco products and other risk factors, including alcohol consumption, may show synergistic effects in increasing cancer risk, though the research findings are not yet conclusive (Hecht 1999).

Diet is one of the most important factors influencing carcinogenesis (Doll & Peto 1981). Many dietary items are associated with a decreased risk of cancer in humans, particularly fruits and vegetables (Riboli & Norat 2001). Fruits and vegetables contain numerous constituents that may be helpful in preventing carcinogenesis, especially dietary fibre, micronutrients and phytochemicals. Dietary fibre may act in several ways to reduce colon cancer risk, including: 1) diluting carcinogens in the digestive tract by providing bulk, 2) directly binding carcinogens and preventing uptake by the body, 3) decreasing carcinogen contact with mucosal cells of the digestive tract, and 4) modifying enzymatic activity in the colon. Micronutrients, such as β-carotene, selenium, and vitamins E & C are most likely effective in cancer prevention by acting as anti-oxidants. Phytochemicals can act in a number of ways, including modulating metabolism, hormone production, and cell-cycle functions (Greenwald, Clifford & Milner 2001).

Conversely, some dietary items are associated with an increased risk of carcinogenesis. Research has linked consumption of red meats and dietary fat with increased cancer risk (Riboli & Norat 2001), though fat consumption is closely linked to a number of lifestyle factors, confounding the association. Indirectly, through its influence on body mass index (BMI), diet can also influence carcinogenesis because obesity is associated with increased risks of several cancers. Even physical inactivity has been linked to increased cancer risk (Riboli & Norat 2001).

3.4. Selected Cancer Sites

Certain cancer sites have been selected for this study according to both their frequency and etiology. Laryngeal, lung, urinary bladder, and all neoplastic conditions are selected because they occur with sufficient frequency to generate stable rates for analysis, while being related to environmental and occupational exposures. Female breast cancer has been selected as a control to evaluate cancer reporting between regions, because it is not known to be strongly associated with environmental exposures. Childhood leukaemia has also been selected as an indicator of environmental exposure. Because this is a population-based study examining several cancer sites, brief reviews of the pertinent literature will be provided on the epidemiology of each of the above-mentioned cancer sites, in terms of incidence patterns, geographical distribution, and major risk factors, rather than detailed commentaries on the studies and methods used to evaluate potential risk factors for the cancers.

3.4.1. Laryngeal Cancer

Laryngeal cancer is the second most common respiratory cancer, and the eleventh most common cancer overall in men. Incidence of laryngeal cancer has shown moderate but steady increases in many countries worldwide over the past several decades (Cataruzza *et al* 1996). Brazil, France, Italy, Spain, Italy, and regions of Southeast Asia have some of the highest incidence rates of laryngeal cancer (Rafferty *et al.* 2001); the lowest recorded rates occur in regions of Africa and China. Worldwide, cancer of the larynx is usually reported as occurring 3-4 times more frequently in men than women, though some studies have demonstrated rates up to ten times higher in men (Zatonski *et al.* 1983). However, at present, evidence of a decreasing male-female ratio is evident in many countries (Cataruzza *et al.* 1996), most likely because females and males are leading increasingly similar lifestyles in terms of exposure patterns, particularly tobacco and alcohol consumption.

The two most important risk factors for laryngeal cancer that have been identified are cigarette smoking and alcohol consumption (Rafferty *et al.* 2001, Cataruzza *et al.* 1996, Cowles 1983, Rothman *et al.* 1980). Furthermore, the combination of these two exposures has been shown to have a synergistic effect in increasing the risk of laryngeal cancer. Dietary factors have been demonstrated to reduce laryngeal cancer risk, particularly diets high in fresh fruit, vegetables, and vitamins A and C (Cataruzza *et al.* 1996, Riboli *et al.* 1996).

A number of occupational exposures have also been associated with increased risk for cancer of the larynx, including asbestos inhalation (Rafferty *et al.* 2001, Rothman *et al.* 1980), diesel exhaust fumes (Muscat and Wynder 1992), mustard gas (Boyle *et al.* 1992), and occupational exposures to sulphuric acid mists (Soskolne *et al.* 1984). Occupational exposure to polycyclic aromatic hydrocarbons (PAHs) (Boffetta *et al.* 1997) and dust (Goldberg *et al.* 1994, Zheng *et al.* 1992) have also been implicated in laryngeal cancer causation. Indoor and workplace air pollution have also shown associations with the occurrence of laryngeal cancer (Cataruzza *et al.* 1996). Some research has even suggested an association between mineral oils and increased laryngeal cancer risk (Eisen *et al.* 1994).

3.4.2. Lung Cancer

Lung cancer is the most frequently diagnosed cancer in the world and the most common cause of cancer mortality. International patterns of lung cancer incidence tend to correlate with smoking prevalence. As such, rapid increases in lung cancer incidence are now being seen in eastern European and developing nations in response to rising smoking prevalences, while incidence rates in North America and Western Europe have stabilized with more static smoking patterns (Smith & Glynn 2000). Worldwide, men have a 3-4 times increased risk of lung cancer than females. As with laryngeal cancer, the sex ratio of lung cancer cases is becoming more balanced, as more women take up smoking. Survival rates for lung cancer are low, with only 14% of cases surviving 5-years beyond diagnosis (Smith & Glynn 2000).

Approximately 90% of all lung cancers can be attributed to a single exposure – tobacco smoking (Nasca & Pastides 2001). When considering the overwhelming contribution smoking makes to lung cancer incidence, other exposures may seem relatively unimportant. Estimates of the proportion of lung cancers from occupational exposures vary considerably between studies, with current best estimates placing the attributable risk somewhere between 1 and 40% (Vineis & Simonato 1991). Despite the variation evident in these estimates, the link between lung cancer and occupation is well established, and many occupational exposures have been identified as definitive human lung carcinogens.

One of the best-studied occupational exposure-lung cancer associations is that of inhaled asbestos fibres which have been conclusively identified as a lung carcinogen (IARC 1987). Other occupational exposures that are known lung cancer risk factors include nickel and nickel compounds, radon, chromium compounds, coal tars, talc containing asbestiform fibres, PAHs, and employment in the rubber industry (Smith & Glynn 2000, Boffetta *et al.* 1997, Ward *et al.* 1997). Ambient air pollution, genetic factors, and diet have also been implicated as influencing lung cancer risk (Smith & Glynn 2000). IARC-listed definitive human lung carcinogenic (Group 1) exposures present in Sumgayit industry include: asbestos, iron and steel founding, aluminum production, and the rubber industry.

Dietary factors, such as a high intake of fruits and vegetables, are believed to reduce lung cancer risk by approximately 50% (Bepler 1999). Numerous other dietary factors are currently under study.

3.4.3. Urinary Bladder Cancer

The frequency of bladder cancer varies significantly around the world, being most common in North America and Western Europe, and least common in Japan (Johansson & Cohen 1997). Bladder cancer is generally 3-4 times more common in males than females (Parkin *et al.* 1999). Bladder cancer incidence has had only moderate increases

in the United States over the past two decades, which may be in part artifactual owing to changing diagnoses (Ross *et al.* 1996). It is interesting to note that bladder cancer incidence follows a similar temporal pattern to lung cancer in many countries, underlining the importance of tobacco smoking as a common risk factor (Negri & La Vecchia 2000). Mortality, in contrast to incidence, has demonstrated decreases in the past decades which are likely the result of improved treatment techniques (Ross *et al.* 1996).

The primary cause of urinary bladder cancer in men has been identified as cigarette smoking (Wynder & Goldsmith 1977), while occupational exposures have been implicated as the second most important risk factor (Mannetje *et al.* 1999). One paper estimates that in the United States, 20-25% of all male bladder cancers are the result of occupational exposures (Johansson & Cohen 1997). However, another review of occupational bladder cancer research involving both men and women produced much more variable estimates for occupational attributable risk for bladder cancer, ranging from 2-24% (Vineis & Simonato 1991).

Bladder cancer tends to be three times more common in men than women in Europe (Parkin *et al.* 1997), a result that can be explained at least partially by differences in smoking habits. In a large case-control study conducted in the United States examining the effects of primarily occupational exposures, bladder cancer risk was found to be very similar among males and females in exposed populations (Silverman *et al.* 1990).

The most commonly identified occupational risk factors for bladder cancer are the arylamines: 2-naphthylamine and 4-aminobiphenyl (Ross *et al.* 1996). An American study found that bladder cancer in men and women was strongly related to employment in machine trades, and also for men in processing occupations (Anton-Culver *et al.* 1992). IARC has conclusively listed employment in the rubber industry as a risk factor for bladder cancer (Ward *et al.* 1997.) Some researchers have also found an increased risk of bladder cancer with employment in the manufacturing industry, particularly tobacco products, wood, and non-metallic mineral product manufacture (Mannetje *et al.*

1999). Excesses of bladder cancer have also been discovered among persons employed in aromatic amine manufacture, dyestuff manufacture, painting, the aluminum industry (Negri & La Vecchia 2000), and in persons exposed to PAHs (Boffetta *et al.* 1997).

As is the case with many other cancers, diet is believed to influence bladder cancer risk, though the relationship is not yet well understood (Johansson & Cohen 1997). Certain agents in drinking water, including disinfection by-products, as well as the volume of fluid consumed, have also been implicated as influencing bladder cancer risk (Negri & La Vecchia 2000).

3.4.4. Female Breast Cancer

Breast cancer continues to be the most commonly occurring cancer in women, and one of the leading causes of death for women around the globe. While the disease does also occur in men, it occurs at a mere fraction of the frequency in women, with incidence rates up to 100 times lower (Brewster & Helzlsouer 2001). The most industrialized regions of the world, such as North America and Northern Europe, demonstrate the highest rates of breast cancer, while Eastern and Southern Europe and Latin America demonstrate intermediate rates, with the lowest incidence rates occurring in Africa and Asia (Lipworth 1995). A pattern of global increase in breast cancer incidence rates has been noted in the past twenty or thirty years, though mortality rates have not demonstrated similar increases (Sasco 2001).

A great deal of research has been conducted exploring risk factors for this disease, particularly at the individual level. Consequently, a number of lifestyle and behavioural risk factors have been identified for breast cancer, including: diet, alcohol consumption, obesity, exogenous hormonal supplementation, parity, and reproductive patterns (Brewster & Helzlsouer 2001, Sasco 2001, Goldberg & Labreche 1996, Lipworth 1995). While many other exposures such as alcohol consumption, dietary fat intake, and various

other behaviours have been studied, few conclusive links to breast cancer have been established (Goldberg & Labreche 1996, Lipworth 1995).

Less research has been conducted on the relationship between environmental exposures and breast cancer, though several exposures have been implicated in the causation of this disease. One of the few environmental risk factors identified for breast cancer has been exposure to ionizing radiation (Lipworth 1995, National Research Council 1990). In fact, in a large systematic review (115 studies) of occupational breast cancer research, little or no evidence could be found linking occupation to increased breast cancer risk, though methodological inadequacies may be blamed for the lack of hard results (Goldberg & Labreche 1996). Still, there have been several studies generating positive results on the purported link between occupation and breast cancer (Goldberg & Labreche 1996, Morton 1995).

3.4.5. Childhood Cancer

Although cancer occurs relatively infrequently in children, it remains an important cause of childhood mortality in developed regions of the world, if only because of the paucity of competing mortality causes at this stage of life (Greenberg & Shuster 1983). The category "childhood cancer" as used in this study is a catch-all grouping, as many clinically distinct cancers are lumped together by the age of the patients, rather than by clinical or histological similarities of their diseases. The two most common cancers occurring in children are leukemias and tumours of the brain and central nervous system (Sharp *et al.* 1999). The third most common cancers of children are the lymphomas. Research has generally shown elevated incidence in females relative to males.

Several birth characteristics have been associated with an increased risk for childhood cancer, including maternal age, birth order, and birth weight (Little 1999). However, environmental exposures have also been studied in relation to cancer in children. Most of these are prenatal, and describe maternal behaviour during pregnancy, such as exposure

to exogenous hormones, irradiation, and maternal viral infection (Little 1999). Several postnatal exposures have also been implicated, including postnatal irradiation and exposure to magnetic fields, but results are yet inconclusive (Davies & Ross 1998).

The relationship between parental occupation and cancer in offspring also has been studied. Associations between parental occupation and childhood cancer have been demonstrated, though the results have not been consistent (Little 1999). Several studies have implicated parental exposures obtained in lead- or hydrocarbon-related occupations (Arundel & Kinnier-Wilson 1986). In a population-based case-control study conducted in Moscow, researchers found evidence of an increased risk of childhood cancer with both paternal and maternal exposures. Paternal exposures to ionizing radiation, electromagnetic fields (EMFs), and unspecified chemicals were found to significantly increase the risk of childhood leukemia. Similarly, maternal exposures to solvents, unspecified chemicals, ionizing radiation, and EMFs were even more strongly implicated (Smulevich, Solionva & Beyakova 1999). Another study found paternal exposures to solvents, solders, and diesel fuel to be associated with childhood neuroblastoma, while no associations were found with maternal exposures (De Roos 2001). Owing, in large part, to difficulties in exposure assessment among parents, strong causal relationships between specific exposures and childhood cancer have not yet been established. Citing a lack of consistent results and problems in exposure assessment, systematic reviews of the literature have found the available evidence to be inconclusive (Little 1999, Arundel & Kinnier-Wilson 1986).

3.5. Health Care System of the former Soviet Union

The health care system of the former Soviet Union was designed with the primary goal being the maintenance of a productive work force (Barr & Field 1996). High quality universal health care was to be provided as a right of citizenship, at no cost to the public. In practice, however, the system suffered from a number of problems. Centralization, bureaucracy, and standardization were the hallmarks of Soviet health care. The system

aimed to provide large numbers of physicians, medical staff, and hospital beds in all regions of the nation, at rates considerably higher than in Western nations. Indeed, many successes were achieved by the Soviet health care system, most notably the provision of universal health care, and the effective management of communicable diseases.

The health care system was organized at a rayon (i.e., district) level, with each rayon being required to have sanitary-epidemiologic stations, hospitals, polyclinics, and specialized treatment facilities for specific health problems, such as tuberculosis or cancer (Tulchinsky & Varavikova 1996) (Figure 3.1). Sanitary-epidemiological stations dealt primarily with public health issues, such as sewage treatment, air/water/ground quality, infectious disease outbreaks, and children's health. "Medsanchast"clinics located at industrial plants provided on-site occupational and medical services, and "prophylactory" clinics provided a range of rehabilitation services, sanatoria, and vacation benefits.

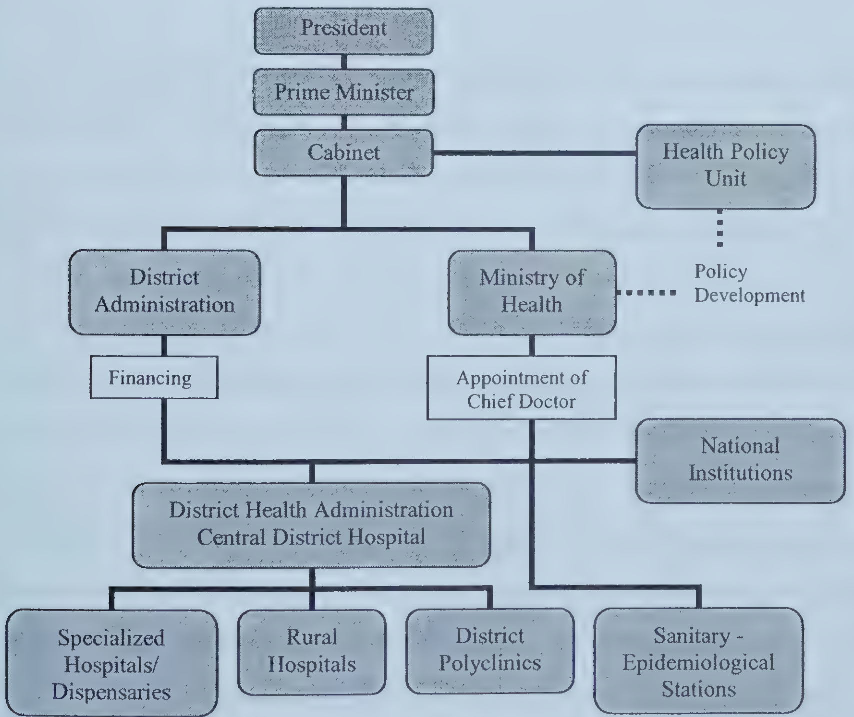

Figure 3.1. Organizational structure of the Soviet health care system (Adapted from Health Care Systems in Transition: Azerbaijan, WHO 1996).

Health care spending in the former Soviet Union was much lower on a per capita basis than in the West (Barr & Field 1996). Owing to a lack of funding and the philosophical approach taken in which medical treatment, rather than primary prevention was favoured, several aspects of health care in the USSR suffered, particularly the management of chronic and non-communicable diseases (Tulchinsky & Varavikova 1996). Resources were stretched thin, and both basic supplies and medical equipment were lacking in many clinics. Training of physicians was less rigorous than in the West, as medical schools aimed to produce large cohorts of physicians to satisfy the goals of the health care system. Furthermore, because few resources were allocated to research and modernization of medical treatment, physicians in the former USSR did not have the opportunity to develop modern treatment modalities and equipment (Barr & Field 1996). A shocking statistic reported by the State Statistical Committee of the former Soviet Union was that as of 1990, "…24% of hospitals lacked plumbing, 19% lacked central heating, 45% lacked bathrooms and showers, 29% lacked hot water, and 15% operated without any water at all" (Tulchinsky & Varavikova 1996).

Adding to the problem was pervasive corruption, nepotism and elitism in the health care system (Barr & Field 1996). Through nepotism and corruption in the medical schools, a significant proportion of doctors was allowed to graduate without being able to perform even basic medical procedures. Perhaps one of the most appalling figures is that of the meagre health care budget, approximately half of which was spent providing health care to the political elites who comprised less than 1% of the total population (Barr & Field 1996). Thus, the remaining 99% of the population were allocated less than 2% of the nation's Gross Domestic Product (GDP) for health care funding. The WHO website lists Azerbaijan as currently allocating 2.5% of GDP to health care, or US$13 per capita annually. Comparing percentage GDP spending on health care internationally is, however, complicated by the disparities in wealth among nations. To put health care spending in Azerbaijan into perspective, Canada currently spends 9.3% of its GDP on health care, which equates to US$1847 per capita annually. Latest figures show that Azerbaijan employs 360 physicians per 100,000 population, while Canada only employs 229 for a population of the same size (WHO Website).

These dire conditions worsened in the years immediately following the collapse of the Soviet Union. Economic and political strife have resulted in decreases in health care spending (Wyon 1996), and rampant corruption (Barr & Field 1996). Health care spending dropped from 2.9% of GDP in 1990 to a mere 1.2% in 1997 (Quliyeva & Huseynov 1999). Little incentive remained for physicians to function at an optimal level, as their wages were lower than those of average factory workers (Tulchinsky & Varavikova 1996). This resulted in the development of a large informal or "underground" payment system whereby patients paid physicians directly. Informal payments are believed to be of the same magnitude as public funding in the health care system of Azerbaijan (WHO 1996).

In a 1996 report, the WHO lists several reasons for the deterioration of the health care system in Azerbaijan in the post-Soviet period, including: 1) funding shortages due to economic collapse, 2) lack of in-country management capacity, 3) failure to adapt to scarce resources and to reduce overcapacity in the health care system, 4) disruption of the former Soviet health network and the medical supply system, 5) inadequate primary health care, 6) poor population coverage in the transition period, and 7) loss of health promotion programmes (WHO 1996).

The disarray of the health care system in the post-Soviet era is clearly evident in the substantial drops in various health indicators during the early and mid-1990s (Notzon *et al.* 1998). Although modest recovery has been made since that time, the health care system remains in a troubled state (Tulchinsky & Varavikova 1996).

3.6. Cancer Treatment and Data Collection in the former Soviet Union

Registration of all new cancer cases was made mandatory in the former USSR beginning in 1953 (Dowd 1992). Still, not all of the former republics have established population-based cancer registries. Cancer registration and treatment in the former Soviet Union was accomplished primarily through a network of cancer dispensaries (Rahu 1992). These were specialized hospitals responsible for treating and collecting lifelong follow-up information on individuals diagnosed with cancer. Data collected in these institutions were recorded in specialized forms, and by their own classification systems. However, the data collected by these institutions were also summarized in annual reports at the regional and republic levels using the 9th Revision of the International Classification of Diseases (ICD-9), and delivered to the national Ministries of Health (*See Appendix I: Cancer Data Forms*). Reports are completed within six weeks following year's end and describe the cancer control situation for the previous year. It is important to note that all statistics compiled are taken as final, and are never edited or revised, even if errors or omissions are subsequently detected (Rahu 1992).

Such methods can lead to a number of inadequacies and errors in the data. In a published paper reviewed by Mati Rahu, mortality exceeded incidence rates in approximately one-sixth of the areas of the former Soviet Union, demonstrating major inaccuracies in data collection. He concluded that the problems were most profound in the Central Asian Republics (CAR). Further, in some areas it was discovered that between 12 and 13% of cancer cases had not been reported owing to lapses in the registration system. Indices of data quality exist, but are plagued by methodological problems, and are not standardized between regions, providing little confidence in their usefulness. These issues have lead Rahu to conclude "All this, together with low-level control over data quality, has led to alarming inadequacies in official cancer incidence statistics. The situation is most critical in epidemiologically attractive Kazakhstan and Central Asia, where, in addition, population census data and vital registration data are of poor quality" (Rahu 1992). These same problems may only be worse for cancer mortality data, as death registration presents further opportunity for errors and omissions to occur.

Despite the presence of health information systems, relatively little cancer epidemiology research was conducted in the former USSR, aside from several case-control studies for high risk groups (e.g., esophageal cancer in republics bordering the Caspian Sea) (Dowd 1992). Most of the cancer epidemiology previously conducted in the former Soviet Union was descriptive in nature, and based on data collected during cancer registration (Rahu 1992). Because of the peculiarities specific to cancer registration in certain republics, or even rayons, comparisons among geographical areas are made difficult, and the results generated may not be accurate. Even attempts at correcting officially reported data have often met with failure. In several recent studies, Rahu notes that researchers have had to review individual case reports and effectively build new cancer registries in order to ensure the collection of accurate data (Rahu 1992).

Studies of either environmental or occupational carcinogenesis in the USSR were greatly hampered by government restrictions and/or censorship. Government concerns prevented the publishing of pollution, statistical, and epidemiologic data (Tulchinsky and Varavikova 1996, Bulbulyan 1995), which made attempts to study the links between environmental pollution and disease impossible. Occupational cancer studies were banned because the implication of conducting such research was that occupational health policies and regulations were substandard. International scientific literature was greatly restricted, preventing local researchers from obtaining reports and research from other countries (Barr & Field 1996).

For these reasons, the field of epidemiology is only now developing in this region, and opportunities for epidemiological research abound in an area of the world in desperate need of such scientific expertise. In addition, making knowledge available about the effects of environmental and occupational exposures in this region of the world to the international scientific community could bring additional weight and valuable information to our understanding of the relationships between exposures and health outcomes.

Chapter 4: Methods

4.1. Study Design

This descriptive study utilizes population-level annual summary cancer data and demographic information collected at the rayon (regional) level over the period 1980-2000, supplemented with lifestyle survey data, to permit comparisons of cancer rates between the city of Sumgayit and selected populations in Azerbaijan. Several measures of cancer incidence and mortality are compared between the city of Sumgayit and the reference populations. The primary contrast is that of Sumgayit to the Azerbaijan national data, though comparisons are made with other selected regions of Azerbaijan (Ganja and Lenkoran-Astara). Selected data are also compared between Sumgayit and the neighbouring Caucasus countries of Armenia and Georgia, as well as with the Russian Federation. A final contrast is made between cancer rates in Azerbaijan and in Canada.

Comparisons made within Azerbaijan can be seen as internal comparisons because we can expect regions within the country to be affected similarly by social, political, and economic events. Comparisons with international data can be seen as being external in nature because individual nations are expected to experience different influences and to have different processes at work within each. Using both internal and external comparison groups can provide greater interpretive insights.

4.2. Why Cancer?

The primary goal of this research is to quantitatively evaluate the perceived negative health impacts of long-term chemical exposures from industrial chemical production facilities in the city of Sumgayit. A number of disease measures have been anecdotally implicated as being elevated in Sumgayit, including congenital anomalies, infant mortality, and cancer. Cancer has been selected as but a first step in conducting epidemiological research in Sumgayit primarily because of assured access to annual

systematically recorded summary cancer reports at a regional level. Furthermore, because the population of Sumgayit has shown a consistent pattern of growth over the past 50 years, the calculation of cancer rates should be achievable and should accurately gauge the effects of carcinogenic exposures experienced by residents.

There are also a number of methodological reasons why studying cancer as a health outcome in the context of this study may be particularly appropriate. Cancer rates can be used to estimate the health effects of past exposures, because many cancers have long latency periods, often up to 20 years (Roe 1985). Therefore, cancer rates are useful for measuring the effects of occupational and environmental exposures over the past several decades, particularly during the period when the Sumgayit industrial facilities were operating at peak capacity. In addition, the examination of time-trends in cancer rates relative to production levels within the Sumgayit factories may allow hypothesis generation regarding causal relationships between specific exposures and cancers.

4.3. Selection of Study Populations

The primary focus of this study will be the contrast between cancer rates in Sumgayit and the Azerbaijan national data. The national data are expected to be the most stable over time because of the large population size, minimizing the effects of stochastic variation on cancer rates. Furthermore, any regional variations in data collection or recording are averaged, reducing the likelihood of serious biases adversely affecting the analyses.

Four regions within the country have also been selected for comparison with Sumgayit on the basis of cancer incidence and mortality. Study regions were selected by three primary criteria: 1) assured access to high quality demographic, cancer incidence and cancer mortality data, 2) sufficient population size to provide for stable cancer rates, and 3) varying levels of exposure to occupational and environmental pollutants. Brief overviews of each region are provided in tabular format (Table 4.1).

Table 4.1. Overview of the selected study regions in Azerbaijan.

Characteristic	Azerbaijan	Sumgayit	Ganja	Lenkoran & Astara Combined	Lenkoran	Astara
Population (2000)	8,048,600	286,000	300,700	277,800	191,900	85,900
Main Employer	Agriculture, Petroleum	Chemical industry	Metallurgy/ manufacturing	Agriculture	Agriculture	Agriculture
Expected Pollutant Exposure	Average	Very High	Above Average	Below Average	Below Average	Below Average
Latitude	40° 30' N	40° 35' 23N	40° 40' 56N	-	38° 45' 22N	38° 25' 60N
Longitude	47° 30' E	49° 40' 8E	48° 12' 14E	-	48° 50' 52E	48° 52' 60E
Elevation (m)	-	23	704	-	-15	-27
Climate	Dry, semi-arid steppe	Dry, semi-arid steppe	Dry, semi-arid steppe	Dry, semi-arid steppe	Dry, semi-arid steppe	Dry, semi-arid steppe

Ganja is the second largest city in Azerbaijan (2000 pop. 300 700) (SCS 2001), and is located in the west of the country, near the border with Armenia (Figure 1.2). Ganja was chosen as a comparison city because of its similar size, demography and general characteristics, as an industrial city. As such, the high degree of similarity in lifestyle factors between Sumgayit and Ganja is expected to better control confounding related to population-level variations in lifestyle and behaviour. One of the most notable facilities is the large aluminum smelter on the outskirts of the city, which had employed upwards of 3,000 people during peak production. Similar to Sumgayit, however, production facilities currently operate at 5-10% of capacity, indicative of current economic hardship.

A potential weakness that has been identified in using Ganja as a comparison city is that its population cannot be considered truly "unexposed," owing to the industrial nature of the city. As such, using Ganja as a reference in comparisons with Sumgayit may produce diluted measures of effect. Still, Ganja presents an interesting comparison because although its population is subjected to occupational and environmental exposures, they are different from those experienced by the residents of Sumgayit. Unlike Sumgayit, production in Ganja focused primarily on manufacturing and metallurgy, rather than

chemicals. Because cancers at specific anatomical sites are generally related to specific exposures, site-by-site comparisons of cancer rates should minimize any dilution effects.

Lenkoran and Astara are regions located in the extreme southeast of the country (Figure 1.2). The rayons of Lenkoran and Astara have been selected as "unexposed" comparisons, being primarily agricultural districts. For this reason, the probability that residents have been exposed to industrial pollutants is much lower. Unfortunately, owing to the predominantly agricultural occupations of residents in these rayons, we may expect more profound differences in confounding lifestyle factors when comparing these populations to those of the large industrial centres. For this reason, comparisons between Sumgayit and these regions must be interpreted cautiously. The degree to which the prevalence of important confounders differs between the populations has been estimated through a lifestyle survey administered by the Azerbaijan Republic State Committee on Statistics in conjunction with the Azerbaijan Republic Ministry of Health (See Methods Section 4.5).

Although the capital city of Baku would appear to be an obvious choice as a comparison city, with its large population and close geographic proximity to Sumgayit, several methodological problems exist that prevent its inclusion in the study. One of the most serious concerns is that accurate population data are not available for this city. Although *official* data possessed by the Azeri Government estimate Baku's population at approximately 1.7 million persons, the actually number of persons living in the city is suspected to be much higher (nearer the 2.5-3.0 million mark) (Akhundov, *pers comm.*). This is likely the result of the inaccurate enumeration of residents during the census period, and recent influxes of refugees and IDPs following the armed conflict with Armenia.

Furthermore, large numbers of Baku residents are currently or have been employees in Sumgayit industry and, despite residing in the capital, commute daily to Sumgayit to spend their workday. During this time, they also experience many of the same occupational exposures as Sumgayit residents. Thus, including Baku as a comparison

city would have contaminated the "exposed" and "unexposed" groups, resulting in a less robust comparison, and diluted measures of effect.

4.4. Data Collection

Rayon-level cancer data were collected from the archives of the Azerbaijan Republic Ministry of Health in Baku. Hardcopy summary cancer reports submitted to the Ministry of Health from cancer dispensaries in each rayon were used to obtain the required cancer incidence and mortality data (*Appendix I: Cancer Data Forms*). All data were accessed, reviewed, and computerized in Microsoft Excel 5.0© by a group of three persons. All data entry was checked by a different person than the one who entered it. Unfortunately, cancer data spanning all regions and years requested were not available directly from the Ministry of Health archives. Attempts were made to locate missing data by contacting local oncological dispensaries in each of the study regions. This approach was partially successful, filling some of the gaps in the data; however, not all missing data could be obtained. Where discrepancies existed between the Ministry of Health Archive and local oncological dispensary data, the data from the local dispenser were taken as correct.

Data for the following cancer sites were collected for both sexes: cancer of the larynx (ICD-9: 161), cancer of the trachea, bronchus, and lung (ICD-9: 162), cancer of the urinary bladder (ICD-9: 188), and all cancer sites combined (ICD-9: 140-208). Data were also collected on female breast cancer (ICD-9: 174). It must be noted that breast cancer mortality was recorded in a combined category (ICD-9: 174, 175), where male breast cancer (ICD-9: 175) and female breast cancer (ICD-9: 174) mortality were lumped together.

Because of the weak associations shown between occupational exposures and breast cancer, and the high frequency with which it occurs, breast cancer has been selected as a control by which the recording of cancer data can be compared. Since the occurrence of breast cancer is not expected to vary as greatly in response to occupational exposures as several of the other selected cancers, we would expect breast cancer rates to be relatively

similar among study regions if cancer reporting among the regions is uniform. If major differences in breast cancer burden are seen between regions, and these differences are not explainable by variations in lifestyle, one may suspect differential cancer reporting between regions to be a potential reason for the differences.

Data collected included both the number of incident cancer cases, and the number of cancer deaths per year for each of the selected cancer sites in each of the study regions. Wherever available, these data were collected by sex and 5-year age groups. In the instances where age and sex-specific data were not available, crude numbers were recorded.

Attempts were also made to collect data for childhood cancers from the Ministry of Health archives, though these data were generally of poor quality and/or unavailable. Consequently, a further effort to collect childhood cancer data was made by visiting the Children's Oncological Centre in Baku. Hardcopy individual case histories spanning the period 1980-2000 were reviewed and all childhood leukemias (ICD-9: 204-208) or neurological cancers (ICD-9: 191, 192) were recorded. For each case, cancer site, age at diagnosis and/or death, name, and rayon of residence were documented.

Population data for each of the study regions were provided in electronic form by the State Committee on Statistics. Demographic data were supplied by sex and 5-year age groups for each year over the period 1980-2000. Population sizes were necessary to provide denominators for rate calculations. Crude cancer incidence and standardized mortality rates for several of the cancer sites being studied were obtained for selected international populations of interest from the World Health Organization's European Health for All Database (WHO HFA Website).

Ethics approval for all data collection (including administration of two lifestyle surveys in Azerbaijan) and analytical procedures was sought for and obtained from the University of Alberta Health Research Ethics Board (May 2001).

4.5. Control of Confounding – Lifestyle Survey

Two independent surveys were conducted in Azerbaijan to estimate the prevalence of selected confounding lifestyle factors, including age, diet, smoking, alcohol consumption, and family history of cancer. The first survey was conducted by students in the city of Sumgayit, the second by the State Committee on Statistics in all three study regions: Sumgayit, Ganja, and Lenkoran-Astara. The student-administered survey had two major goals: one, to act as a pre-test of the questionnaire to be used by the SCS; and two, to validate the results of the survey conducted by the SCS. The questionnaires were either presented in Azeri or Russian. Examples of the English, Russian, and Azeri questionnaires, and their accompanying information letters are presented in *Appendix II: Lifestyle Survey Questionnaires*.

4.5.1. Sample Size Calculation

Sample size (n) for the lifestyle survey was determined using the formula:

$$n = \frac{Z^2_{\alpha(2)}pq}{\delta^2}$$

where Z is the 2-tailed normal deviate (in this case 1.96)
p and q are the expected sampling proportions
and δ is the desired sampling error (for this study 0.05)

Smoking was considered to be the most important potential confounding variable. Smoking prevalence in Azerbaijan was estimated to be 30% ($p = 0.30$, $q = 0.70$). A sample size of 323 was adequate to estimate a smoking prevalence of 30% with ±5% error. However, owing to limited time and resources, the Sumgayit student survey was limited to ~300 persons. The survey later conducted by the State Committee on Statistics achieved the desired sample size, sampling 350 persons from each study region.

4.5.2. Student-Administered Questionnaire

In order to validate the results of the larger survey administered by the State Committee on Statistics in July –August 2001, a survey of similar size (294 persons) was conducted

in selected districts of Sumgayit during early June 2001. A randomized sampling method was used to ensure a representative sample of adults would be generated. Two administrative districts are present in Sumgayit, "quarters" and "microrayons." Microrayons have higher population densities, being composed of large-scale apartment complexes, while quarters tend to have smaller developments and correspondingly fewer residents. Of 47 such units, 20 were randomly selected using a stratified method (10 in the microrayon stratum, and 10 in the quarter stratum). It is important to note that three of the districts originally selected were later excluded, two because they were composed almost entirely of refugees and another that had no residential dwellings (corresponding to a park).

A group of fifteen student volunteers from Khazer University, a post-secondary medical institution located in Baku, administered the questionnaires as a practical extension of their course work. The students traveled as a group by bus to each of the districts, at which point they separated to conduct interviews individually. In this approach, each student randomly selected a household or person on the street at each location and proceeded to interview one person. Traveling as a group had several advantages, offering improved supervision of students and quality control, better security, and easier logistics. Although using such a large number of interviewers increases the risk of introducing inconsistencies into data collection, given the logistics, time restrictions, and financial constraints of the study, it was not feasible to conduct the interviews any other way.

Efforts were made to minimize any potential problems arising from the large number of interviewers. Unfortunately, owing to limited time and resources, only minimal training of the students in preparation for the interviews was provided. Prior to administering questionnaires, students were allowed to familiarize themselves with the questionnaire and instructed on standardized methods of conducting interviews, in an effort to improve the quality and consistency of data collection. The training session gave students an opportunity to discuss/practice how to administer the questionnaire, how to select only eligible persons, and to respect the rights of individuals who refuse participation.

Consent for conducting interviews was obtained by each of the trained interviewers approaching potential participants on the streets or in their homes. Persons were considered eligible for interview if they were adults aged between 18 and 80 years and had resided in the study city for 18 years or more. Persons not meeting these criteria were excluded. Students were instructed to select every 5th person on the street and/or every 10th apartment to ensure the generation of a representative sample. Interviewers were instructed to appreciate the need for a polite introduction and to engage people only if they were willing to participate. No signed informed consent was included; instead, participation was conditional on tacit consent. Interviewers were requested to record the number of refusals. All persons interviewed were offered an information letter following the interview. The information letter described the research project for which the questionnaire was conducted and contained contact information for persons interested in learning more about the study and their participation in it (*Appendix II: Lifestyle Survey Questionnaires*).

Issues concerning the interviews and the suitability of questions used in the questionnaire during the conduct of the student-administered survey were noted and used to improve the questionnaire administered by the SCS. In this sense, the student administered-survey functioned as a pre-test of the final questionnaire used by the SCS.

4.5.3. State Committee on Statistics-Administered Questionnaire

Control of potentially confounding lifestyle factors was accomplished by incorporating the lifestyle questionnaire into the "Quarterly Questionnaire on Incomes and Expenditures of Households" administered by the State Committee on Statistics in each of the three study regions: 1) Sumgayit, 2) Ganja, and 3) Lenkoran-Astara. The questionnaires were administered in either Russian or Azeri, according to the preference of the participants. The SCS was recommended by the Ministry of Health as the professional organization best able to conduct such a survey. The Ministry of Health provided assurances that the interviewers were well trained and had considerable experience at such tasks. Furthermore, randomly selected households had already been

identified in each of the study regions for the "Income and Expenditures Questionnaire;" all households contacted for interview thus were a subset of those already selected by the SCS. In each of the three regions, 350 people were interviewed during July-August 2001.

All data collected by the SCS were provided in electronic form (Microsoft Excel 1997©) in August 2001. Only raw data were provided, and no summary report was included.

4.6. Data Analysis

The analysis of cancer data is complicated somewhat by the temporal and regional variations in data quality and availability. Therefore, several different methods were used to analyze cancer incidence and mortality data for each of the cancer sites. Both crude and age-standardized cancer incidence rates have been plotted to aid qualitative analyses of regional differences. In addition, the statistically robust multivariate Poisson regression analysis, which accounts for the variables area, year, sex, age, and selected interactions between these variables was also utilized to analyze subsets of the data. Unfortunately, the age and sex-specific cancer incidence data required for detailed multivariate analyses were only available for all study regions for the period 1995-2000. Owing to the same data restrictions, the SIR analysis could only be carried out for the same period. As such, less statistically rigorous quantitative methods have also been utilized to provide more complete overview of the cancer experience in Azerbaijan. Mortality:Incidence Ratios (MIRs), Proportional Incidence Ratios (PIRs), Proportional Mortality Ratios (PMR) and univariate Poisson regression analyses have also been conducted on the available crude incidence and mortality data for the entire study period (1980-2000).

4.6.1. Incidence and Mortality Rates

Numbers of new cancer cases and cancer deaths were used to calculate cancer incidence and mortality rates, respectively, per 100,000 population in each study region. Cancer

and demographic data collected separately from the Lenkoran and Astara rayons were pooled in order to create a larger single population with more stable cancer rates. Crude incidence and mortality data were pooled annually for all years spanning 1980-2000 where data were available. Unfortunately, because age- and sex-specific data were missing for certain years for each of the rayons, only age- and sex-specific data for the years 1995-2000 could be pooled.

Incidence and mortality rates were calculated as a first step in the data analysis. Where data were available, age and sex-specific rates were calculated in addition to the crude rates. Rates for each year were calculated by dividing the number of incident cases (or deaths) in each age-sex group for each year and region by the population size corresponding to that demographic. The result of this calculation was then multiplied by 100,000 to provide a rate per 100,000 population (See below).

$$\text{Incidence per 100,000 Population/year} = \frac{\text{Number of new cancer cases}}{\text{Population size * 1 year}} \times \text{100,000 persons}$$

$$\text{Mortality per 100,000 Population/year} = \frac{\text{Number of cancer deaths}}{\text{Population size * 1 year}} \times \text{100,000 persons}$$

Cancer incidence rates were smoothed for data presentation purposes by taking moving 3-year time-weighted-averages (TWAs) of the rates to decrease the effects of stochastic variation. The TWA is accomplished by taking the mean of cancer rates over successive 3-year periods. For example, using this method, the cancer rates for each of the years 1980, 1981, and 1982 would be averaged to produce a single data point (1980-82). Similarly, the next data point would be calculated by taking the mean of cancer rates from 1981, 1982, and 1983; the third data point by the mean of 1982, 1983, and 1984; and so on. Though having the positive effect of reducing stochastic variability, this method also decreases the total number of data points from the available data. In some instances, where data for certain years is missing and data for 3 successive years cannot be obtained, the number of data points decreases dramatically. It must also be noted that because a mean of the data from three years is being taken, data points in the figures do not represent actual cancer rates, only summary statistics. Further, calculating averages

can exclude potentially important individual data points. However, the advantage of this method is that it makes the visualization of temporal trends and differences between regions much easier to accomplish.

A basic approach to comparing relative cancer risks among populations is the use of age and sex specific rates. Cancer morbidity and mortality rates are separated into age and sex-specific strata, facilitating comparisons between populations on a stratum-by-stratum basis. For each of the cancer sites chosen, morbidity and mortality rates were compared across each stratum of the respective populations in order to visualize relative excesses or deficits in cancer risk relative to the Azerbaijan national data. Some advantages of this method of comparing population data are that differences in rates particular to certain demographics are easily visualized, demographic trends in cancer rates are observable, age and sex do not confound the analysis, and the procedures involved are simple.

4.6.2. Mortality:Incidence Ratios (MIRs)

One technique, among several, used to gain some sense of data quality, is to take the ratio of mortality (number of deaths) to incident cases for each of several cancer sites being considered in a study. Because not all cancer cases die, one expects that the number of cases should always exceed cancer deaths in any one year, and that the ratio between the two should be proportional to the known survival for each particular site, if incidence and mortality are reported accurately. For example, cancers with poor survival, such as lung cancer, are expected to have an MIR closer to 1 than cancers with better survival, such as testicular cancer, or in this study, breast cancer. If one were to find the MIR to exceed unity, this would provide a definite red flag about the quality of the data. MIRs were calculated using crude incidence and mortality count data for all years from 1980-2000 where data were available.

$$\text{MIR} = \frac{\text{\# deaths over a specified length of time}}{\text{\# incident cases over the same period of time}}$$

4.6.3. Rate Standardization

Rate standardization is a technique that allows incidence or mortality rates to be compared among different populations while controlling for differences in the age and sex structures of the populations. Rate standardization is accomplished by multiplying age and sex-specific rates by the age distribution of an external reference population. One of the most commonly used reference populations for cancer rate standardization is the world standard population (Doll & Cook 1967). Rates calculated from the Azerbaijan data were standardized both against the world standard population and the 1991 Azerbaijan national population. The age distributions of these populations differ considerably (Table 4.2).

Table 4.2. Standard populations used for rate standardization of Azerbaijan cancer data.

Age group	World standard population	Azerbaijan 1991 population
0-	12000	11934
5-	10000	11244
10-	9000	9858
15-	9000	9176
20-	8000	9546
25-	8000	9560
30-	6000	8794
35-	6000	6242
40-	6000	4587
45-	6000	2467
50-	5000	4599
55-	4000	3896
60-	4000	3289
65-	3000	1841
70-	2000	1034
75+	2000[a]	1932
Total	100000	100000

[a] The standard world population has listed categories of 75-, 80-, and 85+, but these were collapsed into a single 75+ category for use in this study, because cancer data collected in Azerbaijan include 75+ as the oldest age group.

4.6.4. Proportional Mortality Ratios (PMRs)

The Proportional Mortality Ratio (PMR) is a means of estimating the burden of a disease in an exposed population by comparing the proportions of disease from selected causes to those in a reference population. This measure is particularly useful for studies in which age- and sex-specific data are unavailable, as PMRs do not require that the population structure be known. PMRs compare the proportion of incident cases or deaths from a specific cause in an exposed population to the corresponding proportion in an unexposed (reference) population. By so doing, relative excesses or deficits for certain causes of death can be examined in the exposed population. Because PMRs deal only with proportions, potential confounding owing to temporal or regional differences in age and sex distributions of the populations being compared is controlled. A PMR is calculated as follows:

$$\text{PMR} = \frac{\text{proportion of deaths from specified cause (exposed population)}}{\text{proportion of deaths from specified cause (reference population)}}$$

or, in mathematical terms (Breslow & Day 1987):

$$\text{PMR} = \frac{D}{\sum t_j \, (d_j^* / t_j^*)}.$$

where:

D is the total number of deaths from the cause of interest in the exposed group
t_j is the is the total number of age-specific deaths from all causes in the exposed group
t_j^* is the total number of age-specific deaths from all causes in the reference group
d_j^* is the total number of age-specific deaths from the cause of interest in the reference group

95% confidence intervals for PIR and PMR analyses were calculated using the method suggested by Breslow & Day (1987). Standard errors for the log of the PIR or PMR were obtained using the formula below:

$$\text{SE (log PMR)} = \sqrt{\left(\sum d_j \, (t_j - d_j) / t_j\right)} / D$$

A PMR > 1 means that the outcome of interest occurs proportionately more in the exposed than the reference population, and implies that the exposed population is a greater risk for that outcome. PMR results must be interpreted cautiously because variations in the frequencies of other diseases can have major effects on the proportionate mortality caused by the specified disease(s) of interest, which may lead to erroneous conclusions. It is therefore imperative to have a good understanding of the population at risk, and to carefully examine cause-specific mortality rates before drawing conclusions from PMR analyses. The analog to a PMR that uses incidence, rather than mortality data, is known as a Proportional Incidence Ratio (PIR), and is calculated and interpreted the same way.

Given that only crude cancer incidence and mortality data were available for much of the study period, the use of PIRs and PMRs may be particularly helpful for examining the cancer experience between regions. PIR and PMR analyses allow the calculation of a single summary statistic including all data from the years 1980-2000, providing a semi-quantitative measure of differences in cancer burden between regions.

It must be noted that for the PIR and PMR analyses, a new cancer category was created to better evaluate differences in cancer rates between regions. The category of 'All other cancers, (ICD-9: 140-160, 163-173, 175-187, 189-208)' was created by subtracting, annually, the number of cases (or deaths) of each of the previously selected cancer sites, including laryngeal (ICD-9: 161), trachea, bronchus, & lung (ICD-9: 162), female breast (ICD-9: 174), and urinary bladder (ICD-9: 188) cancers from the 'All cancers combined (ICD-9: 140-208)' category. This step was taken to better understand the cause-specific proportionate incidence/mortality estimates for each region, ensuring that elevated PIR and PMR estimates for a certain site and region were not caused simply by a lack of competing causes.

4.6.5. Standardized Incidence Ratio (SIR) Analysis

The Standardized Incidence Ratio (SIR) provides a population summary statistic. An SIR is a ratio of actual to expected incident cases for a particular population. The number of expected cases for a study area is calculated by multiplying the age-specific cancer rates from a reference population by the demographic distribution of residents in the study area. For this project, the Sumgayit region is the study population, while the entire Republic of Azerbaijan is the reference population. The total number of observed cases is then divided by the sum of age-specific expected values to produce a ratio for each pairwise comparison. The SIR can be used to determine if excesses or deficits for any health outcome (e.g., cancer incidence) exist between any of the study and reference groups.

An SIR > 1 indicates that the health outcome occurs at a greater rate among the study population than the reference population, and implies that the study population is at greater risk for that outcome. The results of the SIR analysis can provide suggestive evidence whether the health status of the Sumgayit population has been adversely affected by industrial exposures. Though some authors have suggested using Standardized Rate Ratios (SRRs) in place of SIRs due to questions of validity, a recent paper examining the topic has found SMRs and SRRs to provide results of similar quality (Goldman & Brender 2000). In fact, SIRs may be preferable owing to the simplicity involved in their calculation, interpretation and explanation.

SIR analyses were restricted to data from 1995-2000, because age- and sex-specific data prior to that time are missing for certain regions and years.

4.6.6. Poisson Regression Analysis

One of the most rigorous approaches to comparing disease rates between areas is the multivariate Poisson regression analysis (Breslow & Day 1987). Poisson regression

analysis is a technique used to model dependent variables describing count (discrete) data. The model relies on the assumption that the dependent variable (Y) has a Poisson distribution. An example of a Poisson probability distribution with parameter μ is described below:

$$pr(Y; \mu) = \frac{\mu^Y e^{-\mu}}{Y!}, \quad Y = 0, 1, 2, \ldots, \infty$$

The output of a Poisson regression analysis is a rate ratio (a.k.a., risk ratio, relative risk, RR). Simply put, a rate ratio describes the risk of acquiring a disease in one population relative to the risk in another. Rate ratios can be expressed in the form:

$$RR = \frac{\lambda_{ij} \text{ (exposed group)}}{\lambda_{ij} \text{ (reference group)}}$$ where λ is the true (population) risk in the (i j)th group

An example of an equation describing risk for a population as the result of several variables is as follows:

$$\ln[\lambda] = \alpha + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n$$ where α represents the intercept
β represents a regression coefficient
X represents a design variable

From this foundation, one can develop an equation predicting the count (number) of incident cases or deaths (Y) in a given population, given the risk of disease in the population (λ), and population size (l):

$$\ln[Y] = \ln[l] + \ln[\lambda] + \text{Error}$$

This method can be used to develop equations predicting rate ratios between several independent populations, while controlling for confounding variables, and taking into account potential interactions between variables. Although the output of the Poisson regression is somewhat similar to SIR analysis in that it yields a ratio between populations as a result, Poisson analysis is more rigorous because it can adjust for

variables simultaneously other than age and sex. In this study, the Poisson regression analysis is used to test association between selected variables, rather than for rigorous model building.

The fundamental comparison of cancer experience made in this study is a geographical one, i.e., the city of Sumgayit vs. selected reference areas; however, it is complicated by issues of data quality, availability, and a great deal of temporal variation in cancer rates. For these reasons, two separate methods were used to evaluate differences in cancer experience between selected regions of Azerbaijan. These analyses can be placed in two major categories by the type of data used: crude data and age-specific data.

For crude data, only a single descriptive univariate model evaluating regional differences was run for each of the selected cancer sites. For age-specific data, several univariate models were first run on each cancer for descriptive purposes, estimating the independent effects of age, sex, year, and area. Then, a single multivariate model was run on the age-specific data for each of the cancer sites, initially including each of the terms: age, sex, year, area, as well as the biologically and scientifically significant interactions sex*age and area*year. Third-order interactions were not considered because of their instability given the available data and the difficulty in interpreting them.

Unlike SIRs, Poisson analyses require that study populations be statistically independent of one another. Regional populations comprise a subset of the national data and, consequently, the regional and national data are not statistically independent. For this reason, data from the national population cannot be directly compared to regional populations. Removing the regional data from the national totals solves this problem. This can be accomplished by subtracting both the total numbers of cases or deaths and the population size of each of the study regions (Sumgayit, Ganja, Lenkoran-Astara) from the national totals in each age-sex stratum of the data set. By so doing, a new comparison population is defined – “other regions.” This population represents all regions in the nation other than the three selected study regions. In other words, a statistically

independent, yet large and nationally representative comparison population is made available.

Calculating measures of effect using statistically independent samples as described above provides more robust results. In contrast, when the study population represents a subset of a larger reference population, measures of effect will be biased toward the null owing to the lack of independence between the two samples. The extent of this bias is dependent on the frequencies of the disease being studied, and the relative sizes of the populations being compared. The more common the disease, and the greater the proportion of the total data the subset represents, the more diluted the estimate of risk.

Because cancer data are missing for certain regions and years, for the Poisson regression analysis of crude cancer incidence and mortality data, the calculation of the reference population "other regions" was completed using only the available data. For those years where data are missing, the reference population was calculated by subtracting the available regional data from the national averages, rather than discarding that entire year from the analysis. Thus, only the specific region-year cells for which data were missing were excluded from the calculation, rather than the entire year row of data for all regions. While this may not be the most preferable method of calculating the reference category, it was deemed necessary to prevent the exclusion of large amounts of data from the analysis. Unlike the analyses of crude data, for all Poisson analyses of age-specific data the reference category "other regions" was calculated only for the years where data from all regions were complete. This had the effect of restricting analyses to the years 1995-2000.

Regression analysis of the age variable was conducted on data that had been pooled from sixteen 5-year age groups into 4 composite groups corresponding to different stages of life: childhood (ages 0-14), young adult (ages 15-34), middle age (ages 35-54), and old age (ages 55+). Pooling was necessary to ensure that sufficient numbers of incident cases for statistical analysis existed for each of the age group-year combinations being compared. When 5-year age group data were not pooled, 'zero cells' resulted (i.e.,

combinations of age group and year variables for which there were no recorded cases) because of the low numbers of incident cases recorded on a per annum basis in the study areas. Such cells have deleterious consequences for statistical calculations in multiple regression analyses. Pooling the data solved this problem.

Because of the strong age dependency of the cancers studied and the infrequency with which they occur in the younger age groups, further problems were encountered when using the youngest age category (0-14) as the reference group. Rate ratios obtained for the older age groups were often too large for meaningful interpretation, or in the instances where there were no cancers in the 0-14 age group, were unable to be calculated at all. For univariate analyses, the best method to combat this problem was the use of the 15-34 age group as the reference category, because of the greater and more stable numbers of incident cases recorded in this group. For multivariate analyses, this method was not sufficient to prevent the occurrence of 'zero cells' owing to the increased stratification of the data. As such, pooling incidence data from the two age groups (0-14 and 15-34) into a single 0-34 age group for use as the reference category was the preferred option.

While using two different reference categories as described above may appear to be inconsistent, and may make comparisons of age-specific patterns more difficult between the univariate and multivariate analyses, it was deemed necessary in order to provide the most detailed and accurate summary statistics from the available data. Arbitrarily choosing to use the pooled 0-34 age group as the reference category for both multivariate and univariate analyses would have resulted in the unnecessary loss of information from the univariate analyses of age-specific patterns of cancer incidence.

4.6.7. Lifestyle Survey Data Analysis

All data collected in either of the student- or SCS-administered surveys were first screened for completeness and errors. Because the inclusion criteria were not always followed perfectly by interviewers in either survey, individuals not meeting the criteria described in the methods section were excluded prior to analysis. Descriptive statistics were obtained for all continuous data using SPSS 10.0©. For binomial population parameters, 95% confidence intervals were generated using the formulae below:

$p = r / N \qquad q = 1 - p$

$S.E.(p) = \sqrt{(pq / N)}$

$95\% \; CI = p \pm 1.96 * S.E.(p)$

Regional differences in potentially confounding lifestyle factors were then examined by comparing 95% confidence intervals for all parameters.

Chapter 5: Results

5.1. Data Quality and Availability

Cancer incidence and mortality data varied considerably in terms of both quality and availability over time and across regions. Patterns in the data suggestive of data quality are identified, and MIRs are used to further evaluate data quality.

5.1.1. Data Quality

Types of Data Recorded

The type of cancer data collected by the Ministry of Health Archives changed over the period 1980-2000 (Table 5.1). Only crude cancer incidence data were recorded during the period 1980-1988. During 1989-1990, cancer incidence rates were also categorized by sex. Starting in 1991, national summary cancer incidence reports included both sex and 5-year age categories (e.g., 0-4, 5-9, 10-14…). This level of detail was not included in rayon level summaries until 1992. For all years beyond 1992, age and sex-specific cancer incidence reports were collected for all regions. In contrast, only crude cancer mortality data have been collected over the entire period 1980-2000 in all regions. See *Appendix I: Cancer Data Forms* for examples of the data forms used.

Table 5.1. Population-level cancer data availability/accessibility for the study regions over the period 1980-2000.

	Study Region					
Year	**Azerbaijan**	**Sumgayit**	**Ganja**	**Lenkoran-Astara**	**Lenkoran**	**Astara**
1980	C	C	N/A	N/A	N/A	N/A
1981	C	C	C	C	C	C
1982	C	C	C	C	C	C
1983	C	C	C	N/A	C	C
1984	C	C	N/A	N/A	C	N/A
1985	C	C	C	N/A	N/A	N/A
1986	C	C	C	N/A	N/A	N/A
1987	C	C	C	N/A	C	N/A
1988	C	C	C	N/A	C	N/A
1989	S	S	S	N/A	N/A	N/A
1990	S	S	S	N/A	S	N/A
1991	A/S	S	C	N/A	S	N/A
1992	A/S	A/S	*A/S	N/A	S	N/A
1993	A/S	A/S	*A/S	N/A	N/A	N/A
1994	A/S	A/S	*A/S	N/A	A/S	N/A
1995	A/S	A/S	A/S	A/S	N/A	N/A
1996	A/S	A/S	A/S	A/S	A/S	A/S
1997	A/S	A/S	A/S	A/S	A/S	A/S
1998	A/S	*A/S	A/S	A/S	A/S	A/S
1999	A/S	A/S	A/S	A/S	*A/S	A/S
2000	A/S	A/S	A/S	A/S	A/S	A/S

*These data were obtained from the local oncological dispensers because they were not available from the Ministry of Health Archives in Baku.

Legend:
A/S - age- and sex-specific data available
C - only crude data available
N/A - no data available
S - sex-specific data available

Mortality:Incidence Ratios (MIRs)

MIRs have been calculated for all sites and all regions of the country for the entire study period where crude cancer incidence and mortality data were available. Plots of MIRs over the study period for each of the selected cancer sites are displayed below (Figures 5.1 – 5.5). The instability observed in MIRs for several of the cancer sites can be explained by the small numbers of cancer cases and deaths observed on an annual basis (*Appendix III: Cancer Incidence and Mortality Rates*).

All Cancers Combined (ICD-9: 140-208).

MIRs for all cancers combined (ICD-9: 140-208) tend to range between 0.6 and 0.8 for most regions during the study period, with an average of 0.69 for the national data (Figure 5.1). Only one observation exceeds 1.0, that being for Lenkoran-Astara in 1999, and is most likely owing to stochastic variation and small numbers of deaths and incident cases. No obvious temporal or regional patterns are evident.

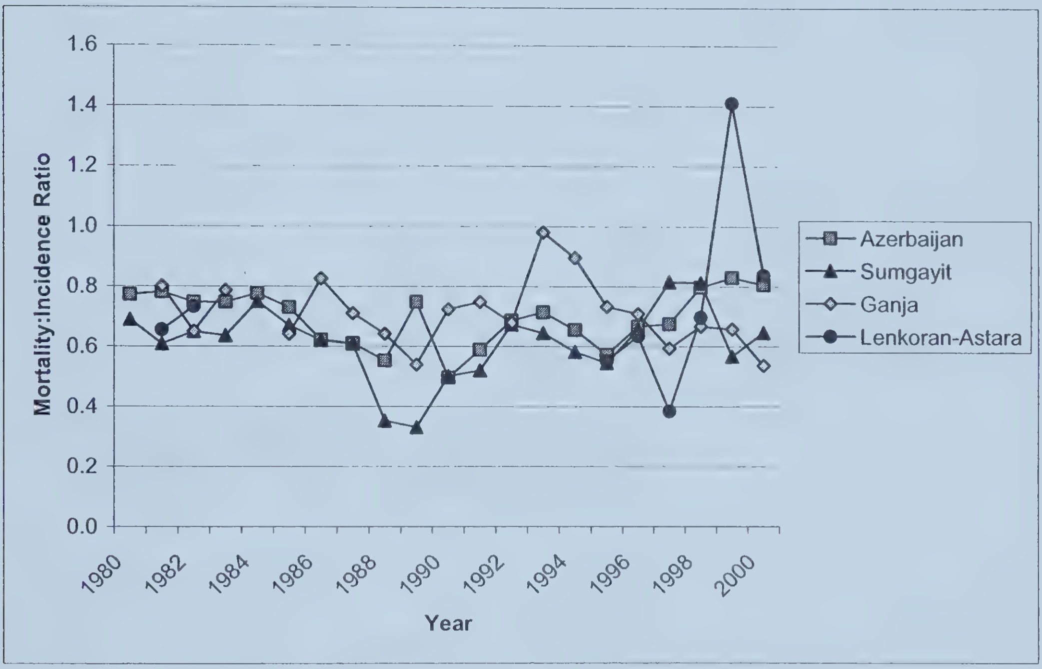

Figure 5.1. Annual Mortality:Incidence Ratios for selected regions of Azerbaijan, all cancers combined (ICD-9: 140-208).

Cancer of the Larynx (ICD-9: 161)

MIRs for laryngeal cancer (ICD-9: 161) demonstrate the greatest variability of the selected cancer sites (Figure 5.2). Sumgayit, Lenkoran-Astara and Ganja have extreme MIR values, in some cases reaching lows of zero and highs of approximately 4.0. Owing to the great deal of variability, likely from few events and unstable rates, no clear patterns or trends are evident.

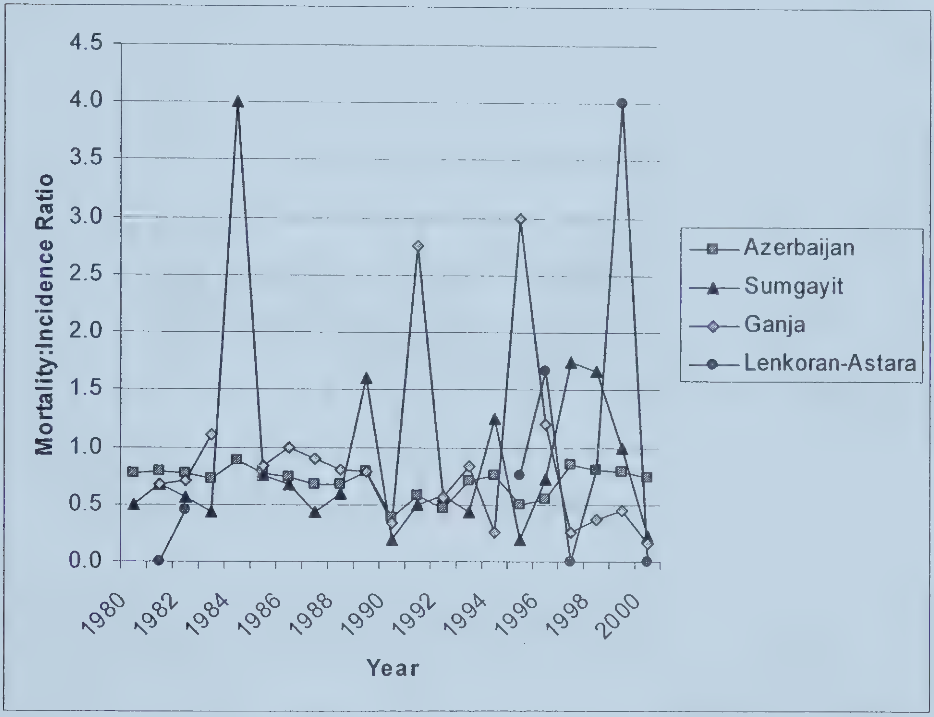

Figure 5.2. Annual Mortality:Incidence Ratios for selected regions of Azerbaijan, cancer of the larynx (ICD-9: 161).

Cancer of the Trachea, Bronchus and Lung (ICD-9: 162)

MIRs for cancer of the trachea, bronchus, and lung (ICD-9: 162) are more stable than those for laryngeal cancer, though considerable variation is still evident (Figure 5.3). It is noteworthy that MIRs in Sumgayit become extremely low during the late 1980s and early 1990s. Once again, any regional or temporal trends may be obscured by variability in the rates.

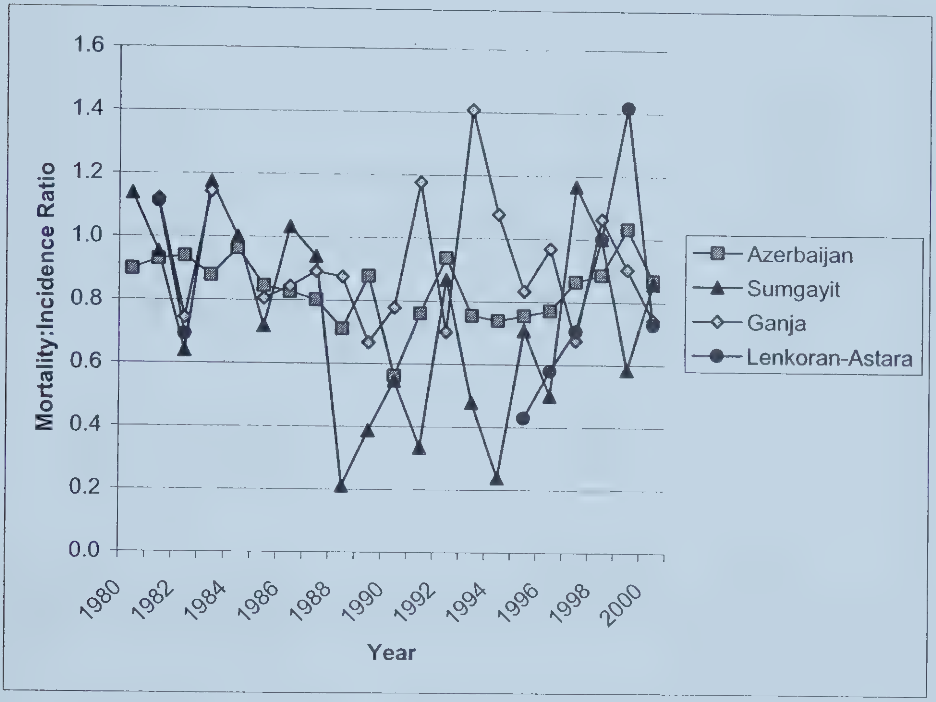

Figure 5.3. Annual Mortality:Incidence Ratios for selected regions of Azerbaijan, cancer of the trachea, bronchus and lung (ICD-9: 162).

Cancer of the Urinary Bladder (ICD-9: 188)

MIRs for urinary bladder cancer show considerable variation, particularly for the Ganja region, for which MIRs exceed 1.5 on three years (Figure 5.4). Another point worth noting is the series of low MIRs for Sumgayit in the late 1980s and early 1990s.

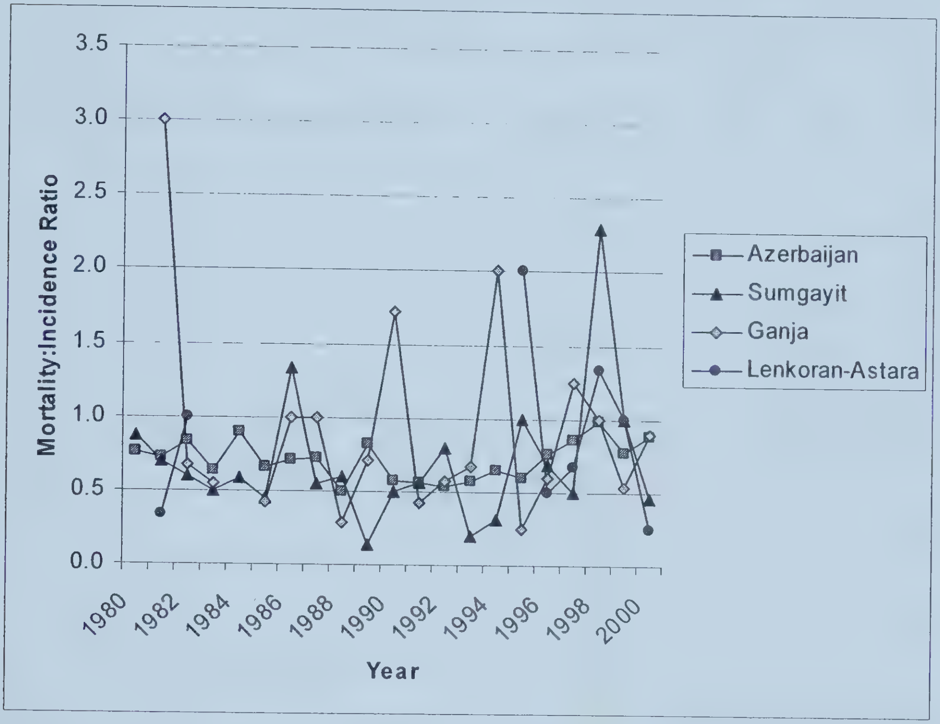

Figure 5.4. Annual Mortality:Incidence Ratios for selected regions of Azerbaijan, cancer of the urinary bladder (ICD-9: 188).

Female breast cancer MIRs are among the most stable of the cancer sites studied (Figure 5.5). Over the entire study period, only a single observation exceeds 1.0. All regions demonstrate a similar range of estimates throughout the study period.

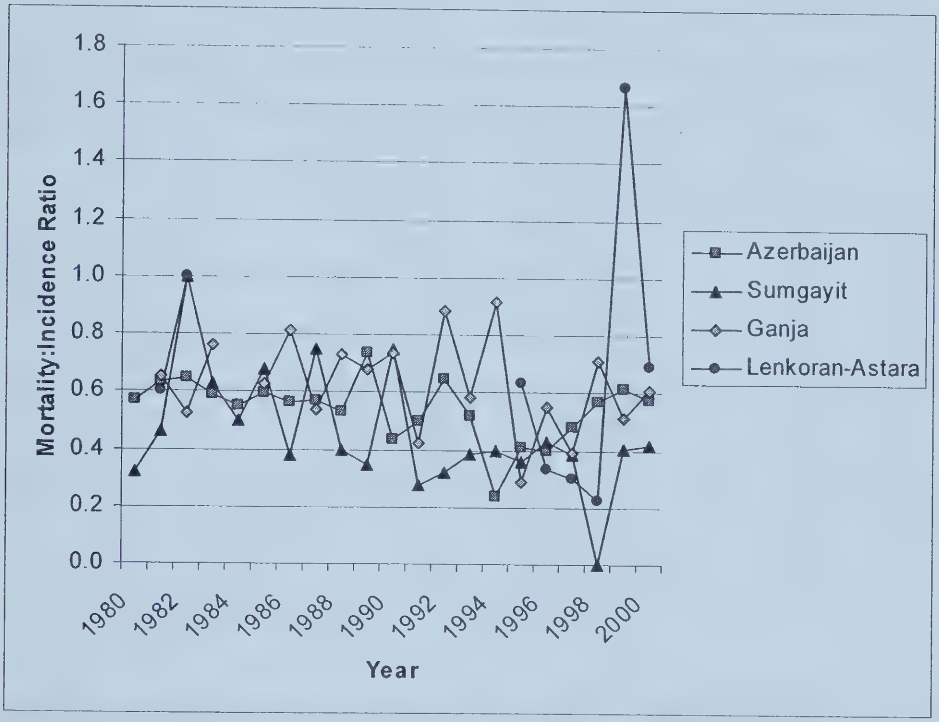

Figure 5.5. Annual Mortality:Incidence Ratios for selected regions of Azerbaijan, female breast cancer (ICD-9: 174).

All MIR estimates show a great deal of variability, with wide confidence intervals. Statistically, no differences among cancer sites or regions are evident. Several patterns do appear in the summary of MIR results, however (Table 5.2). MIR estimates show a trend toward systematic variation by cancer site. In each of the study regions, breast cancer has significantly lower MIR point estimates than either laryngeal, trachea, bronchus & lung, or urinary bladder cancers. Estimates for all cancers combined fall between estimates of breast and each of the other cancer groupings in all regions. Second, MIRs in Sumgayit are lower than those of any other region for each of the

selected cancer sites, except for laryngeal cancer, for which the Azerbaijan population has the lowest estimate. In contrast, either Ganja or Lenkoran-Astara demonstrates the highest MIR estimates for each of the selected cancers. It is interesting to note that MIRs in Lenkoran-Astara exceed 1 by a considerable margin for each of the cancer sites except urinary bladder in the year 1999. The lack of statistical significance of comparisons made may be from small numbers of events resulting in unstable rates.

Table 5.2. Summary of Mortality:Incidence Ratios for selected regions of Azerbaijan over the period 1980-2000.

Site	Azerbaijan		Sumgayit		Ganja		Lenkoran-Astara	
	Mean	Range	Mean	Range	Mean	Range	Mean	Range
All cancers (ICD-9: 140-208)	0.69	0.50-0.83	0.61	0.33-0.81	0.71	0.54-0.98	0.74	0.38-1.40
Larynx (ICD-9: 161)	0.70	0.38-0.88	0.89	0.20-4.00	0.89	0.17-3.00	0.96	0.00-4.00
Trachea, bronchus & lung (ICD-9: 162)	0.84	0.56-1.03	0.74	0.21-1.17	0.92	0.67-1.41	0.83	0.43-1.42
Urinary bladder (ICD-9: 188)	0.72	0.50-0.98	0.70	0.14-2.29	0.92	0.25-3.00	0.89	0.25-2.00
Female breast (ICD-9: 174)	0.54	0.24-0.73	0.46	0.00-0.75	0.63	0.29-0.92	0.68	0.22-1.70

5.1.2. Data Availability

Data availability at the Ministry of Health archives in Baku also differed considerably between regions (Table 5.1.). National and Sumgayit data were available for all years in the period 1980-2000. Data for Ganja were unable to be located for the years 1980, 1984, and 1993-1994. Lenkoran data were missing for the years 1980, 1984-1985, and 1991-1994. Data for the Astara region were unavailable for the years 1980, and 1983-1994.

Some of the missing data were able to be located from local oncological dispensaries. Data for the years 1993-1994 in the Ganja rayon were obtained, as well as for 1998 in the Lenkoran rayon from local dispensers. Although a request for data was made to the Astara oncological dispenser for missing data, no data were provided.

5.1.3. Discrepancies in the Data

For the years where data were available from both the Ministry of Health and the local oncological dispensary, they were checked for concordance. Wherever discrepancies were noted, data from the local oncological dispensary were taken as correct. In Sumgayit, all data obtained from the Ministry of Health were checked against those obtained from the Sumgayit Oncological Dispensary. Concordance was high, though not perfect. Data agreed for all years except for 1998 and 1999, in which several discrepancies were noted. In most instances, the differences were only one or two cases per age-sex group. Similarly, for the years in which both sources of data were available in the other regions, several other discrepancies were also noted. Please note the references to specific discrepancies in the cancer incidence and mortality tables appended (*Appendix III: Cancer Incidence and Mortality Rates*).

In some instances, the sum of age- and sex-specific strata did not equal the officially recorded totals on the data sheet. Though *officially recorded* data were used in almost all analyses, the sum of age-specific strata were used when discrepancies occurred, for the sake of consistency. These discrepancies have been noted on individual tables in *Appendix III*.

5.1.4. Demographic Data

Demographic data for each of the study regions were supplied by the SCS annually for the period 1980-2000, in sex and 5-year age groups. However, during data analysis, it was noted that for each year, all regions, including the national data, have a proportionally identical demographic distribution. It would appear that for each year a single estimate of the demographic distribution for the entire country was obtained, and this distribution was then multiplied by the estimated population size of each of the study regions to provide the number of persons in each of the sex and 5-year age groups. An official enquiry was made to Ministry of Health. However, no response was received.

This method of deriving age- and sex-specific population sizes has major implications for data analysis and rate calculations. One such consequence is that the process of rate standardization undertaken in this study to better compare cancer rates among regions does not have the desired effect. Because the denominator data used in the initial calculation of cancer incidence rates were already based on the same population structure, age-standardization of rates does not improve the comparison of regional differences. However, standardization does control for temporal demographic changes, thereby improving the study of secular trends. For this reason, the process of standardizing incidence rates was not done without value.

5.2. Cancer Incidence

The analysis of cancer data must be prefaced by recognizing that serious questions have been raised in terms of data quality and completeness. Although there is no evidence suggesting that the following analyses are invalid, all results from these analyses must be interpreted cautiously, and in light of the specific data issues identified. One must keep in mind that although the data used for these analyses are imperfect, they do represent the best data currently available on cancer incidence and mortality in Azerbaijan. Furthermore, the MIR analyses discussed earlier suggest that internal comparisons for the purposes of identifying regional excesses may be entirely valid. Greater commentary on this topic will be provided in the Discussion section (see pages 146-147).

Cancer incidence and mortality rates were calculated for each of the selected cancer sites in each of the selected study regions. Both crude and age-sex specific cancer rates were calculated wherever the necessary data were available. Crude cancer incidence data have been summarized in Tables AIII.1-AIII.31, *Appendix III: Cancer Incidence and Mortality Rates*.

Crude cancer rates do not provide the most robust examination of differences in the cancer experience between regions. Observed differences in crude cancer rates may be attributable to disparities in demographic distributions among populations. In contrast,

age-sex standardized rates are adjusted for these factors. However, crude cancer incidence rates are displayed here because they are available for the entire study period (1980-2000). The more desirable age-sex specific rates are available only for the period 1991-2000.

5.2.1. Crude Incidence Rates

Summarized below are the crude cancer incidence rates for each of the five selected cancer sites.

All Cancer Sites Combined (ICD-9: 140-208)

Crude incidence rates for all cancer sites combined have been graphed for the four study regions in Azerbaijan over the period 1980-2000 (Figure 5.6). Considerable variation in crude cancer incidence rates is evident for all study regions.

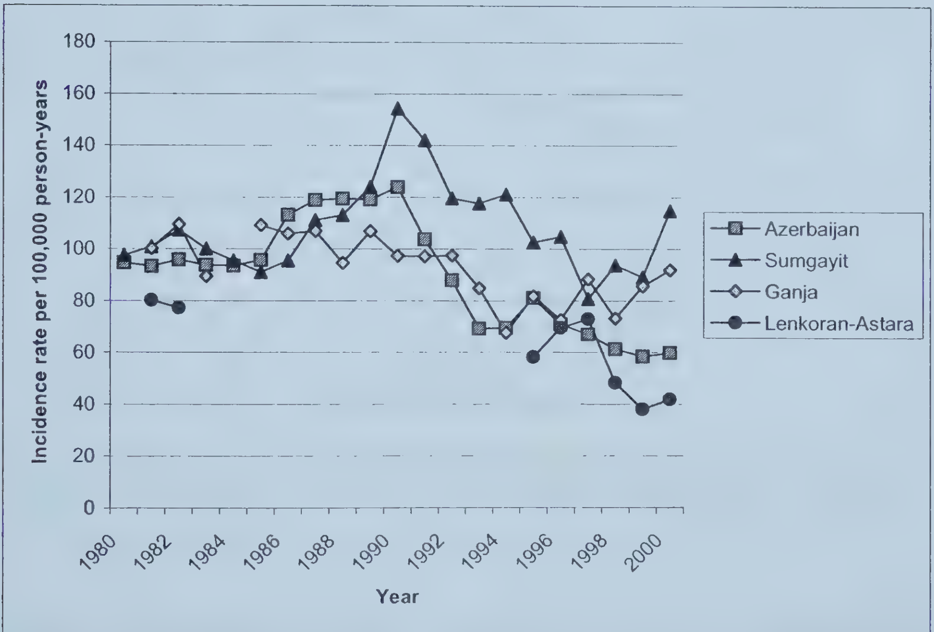

Figure 5.6. Annual crude cancer incidence for selected regions of Azerbaijan, males and females, all cancer sites combined (ICD-9: 140-208).

Smoothing the data through the use of 3-year time weighted averages (TWAs) improves the resolution of trends and differences between study regions (Figure 5.7). Several trends are evident in the data. Crude incidence rates are similar among all study regions throughout the 1980s, and demonstrate only moderate increases. However, beginning in 1990, cancer rates in Sumgayit stand out as being clearly higher than the other regions. Also in 1990, crude cancer incidence rates begin to decline in all regions, a trend that continues through the mid 1990s. Finally, in the mid to late 1990s three of the regions show a trend of stabilization or even of moderate increase. During this period, cancer incidence in Lenkoran-Astara remains below national averages, and continues to decrease.

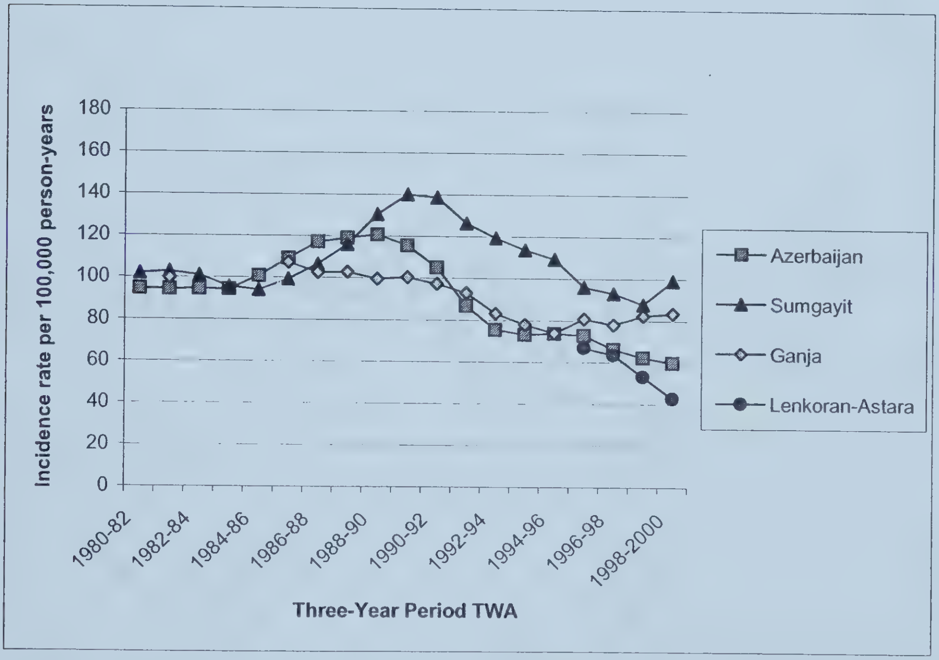

Figure 5.7. Three-year moving time-weighted averages (TWA) of crude cancer incidence for selected regions of Azerbaijan, males and females, all cancer sites combined (ICD-9: 140-208).

Owing to the instability of the crude incidence rates for the remainder of the selected cancer sites (larynx, lung, urinary bladder, and female breast), only three-year time weighted averages will be displayed in subsequent figures. The actual incidence rates are displayed in *Appendix III: Cancer Incidence and Mortality Rates.*

Cancer of the Larynx (ICD-9: 161)

Laryngeal cancer incidence shows considerable variation over the study period, particularly in the Sumgayit and Ganja regions (Figure 5.8). National laryngeal cancer incidence has a similar pattern to that of all cancer sites combined, with the 1980s being a period of relative stability, a moderate increase near the end of the 1980s, and a steady decrease over the 1990s. During the 1980s, incidence rates of laryngeal cancer in Sumgayit tend to be lower than national rates, but national rates decrease markedly in the early 1990s, and consequently by the mid to late 1990s, rates in Sumgayit are higher. Laryngeal cancer incidence is considerably lower in Lenkoran-Astara than in the other regions.

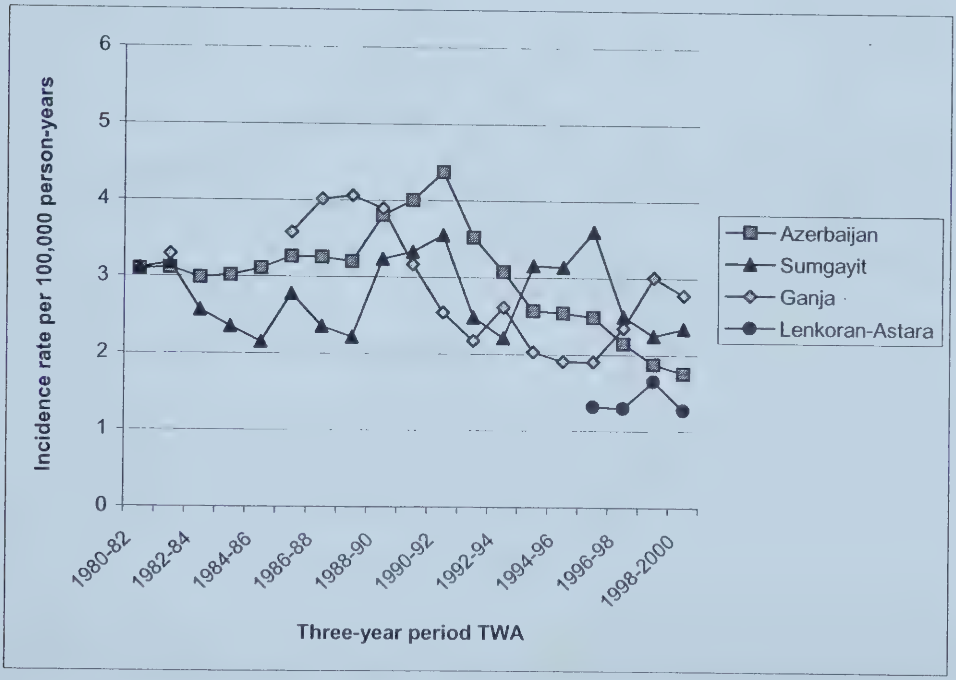

Figure 5.8. Three-year moving time weighted averages of crude cancer incidence for selected regions of Azerbaijan, males and females, laryngeal cancer (ICD-9: 161).

Cancer of the Trachea, Bronchus, and Lung (ICD-9: 162)

Crude lung cancer incidence displays a similar pattern as the previous cancer sites, showing a trend of moderate increase throughout the 1980s, peaking near 1990, and generally decreasing during the 1990s (Figure 5.9). Once again, incidence in Sumgayit is nearly indistinguishable from the national data during the 1980s, but is clearly elevated throughout the 1990s. In the three study regions for which data are available, the early 1990s are characterized by major decreases in incidence, followed by stabilization or increase in the late 1990s.

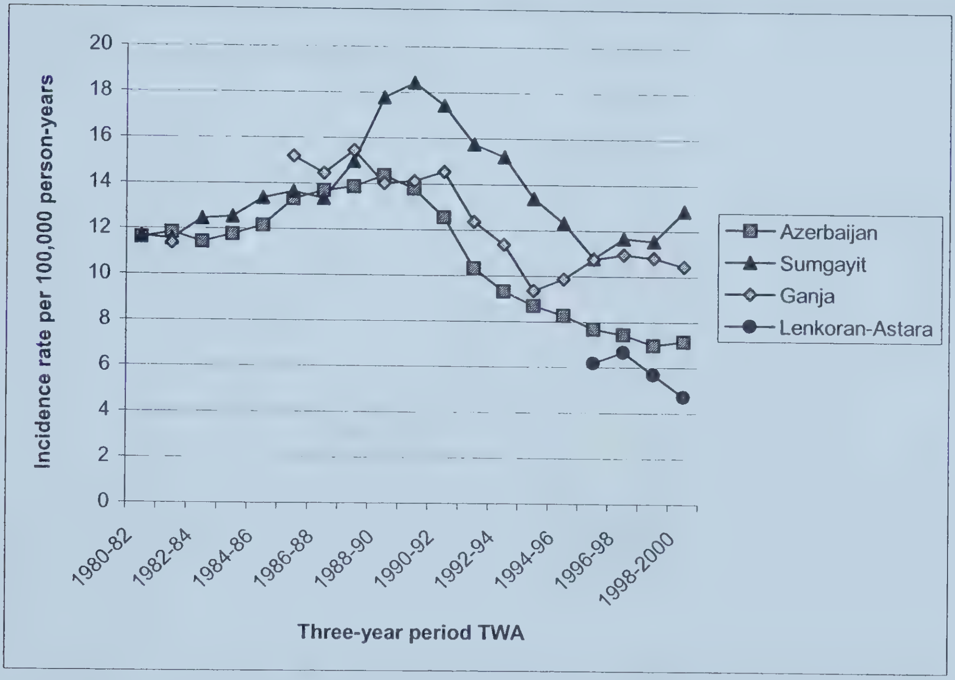

Figure 5.9. Three-year moving time weighted averages (TWA) of crude cancer incidence for selected regions of Azerbaijan, males and females, cancer of the trachea, bronchus, and lung (ICD-9: 162).

Urinary bladder cancer incidence displays a unique temporal pattern relative to the previously described cancer sites (Figure 5.10). The national data has a familiar pattern of general stability over the 1980s, substantial decrease in the early to mid 1990s, and trend toward stabilization in the late 1990s. Sumgayit, however, has a much different pattern, showing major peaks in both the early 1980s and mid 1990s. Aside from a period during the mid to late 1980s, bladder cancer incidence in Sumgayit occurs at a much higher rate than in the other study regions. Incidence in Ganja shows a peak near 1990, followed by a sharp decrease in the mid 1990s and a substantial increase in the late 1990s. Similar to the other cancer sites, bladder cancer incidence in Lenkoran-Astara is among the lowest of the regions.

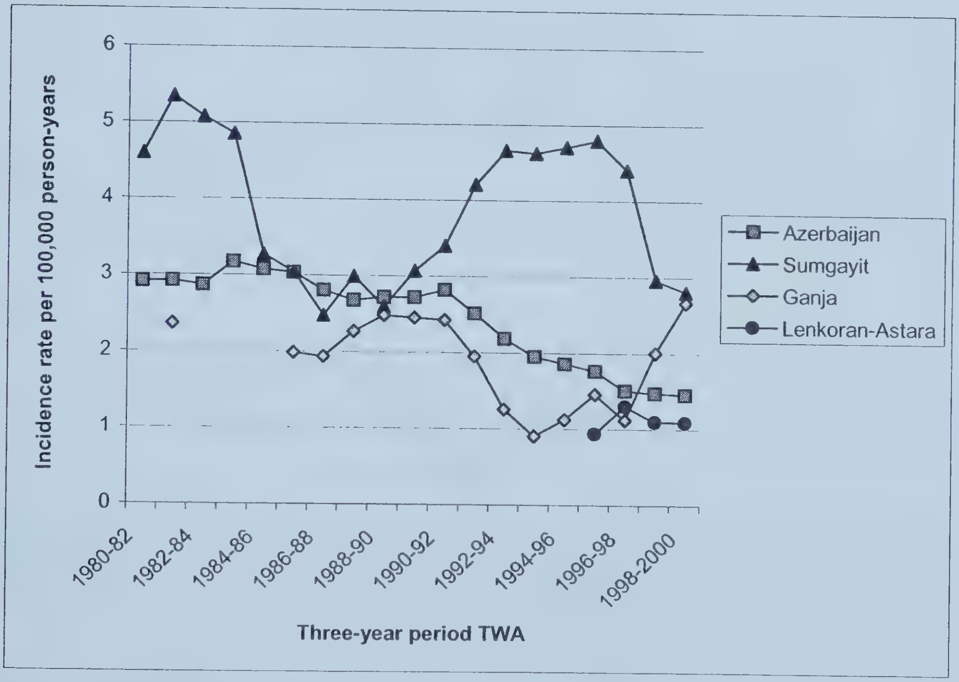

Figure 5.10. Three-year moving time weighted averages (TWA) of crude cancer incidence for selected regions of Azerbaijan, males and females, urinary bladder cancer (ICD-9: 188).

Female breast cancer incidence displays a slightly different pattern among regions than the other cancer sites (Figure 5.11). For both Azerbaijan and Sumgayit, incidence rises steadily over the 1980s, peaking in the early 1990s, followed by a sharp decrease, and eventual stabilization in the mid- to late 1990s. Once again, incidence in Sumgayit only exceeds the national rates in the 1990s. A pattern peculiar to breast cancer is that Ganja generally holds the highest incidence rates throughout the study period. Incidence in Lenkoran-Astara is much lower than the other study regions.

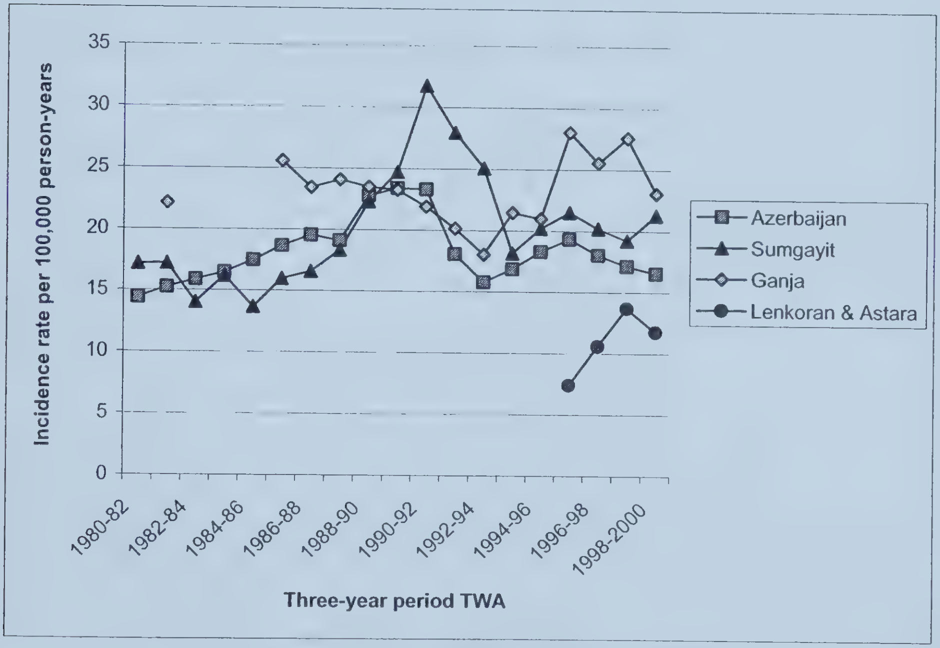

Figure 5.11. Three-year moving time weighted averages (TWA) of crude cancer incidence for selected regions of Azerbaijan, female breast cancer (ICD-9: 174).

Childhood Cancer (Leukemias and Central Nervous System Cancers)

Though data were collected on incidence of childhood cancers in Azerbaijan, the rates were too low and unstable to conduct any meaningful regional analyses. Therefore, only national rates are displayed for childhood cancers of the central nervous system (ICD-9: 191, 192) and leukemias (ICD-9: 204-208) (Figure 5.12). The incidence rate of childhood cancer is lower than most of the other cancer sites studied by a factor of ten. However, the same pattern of increase through the 1980s is evident, peaking near 1990, and decreasing throughout the 1990s.

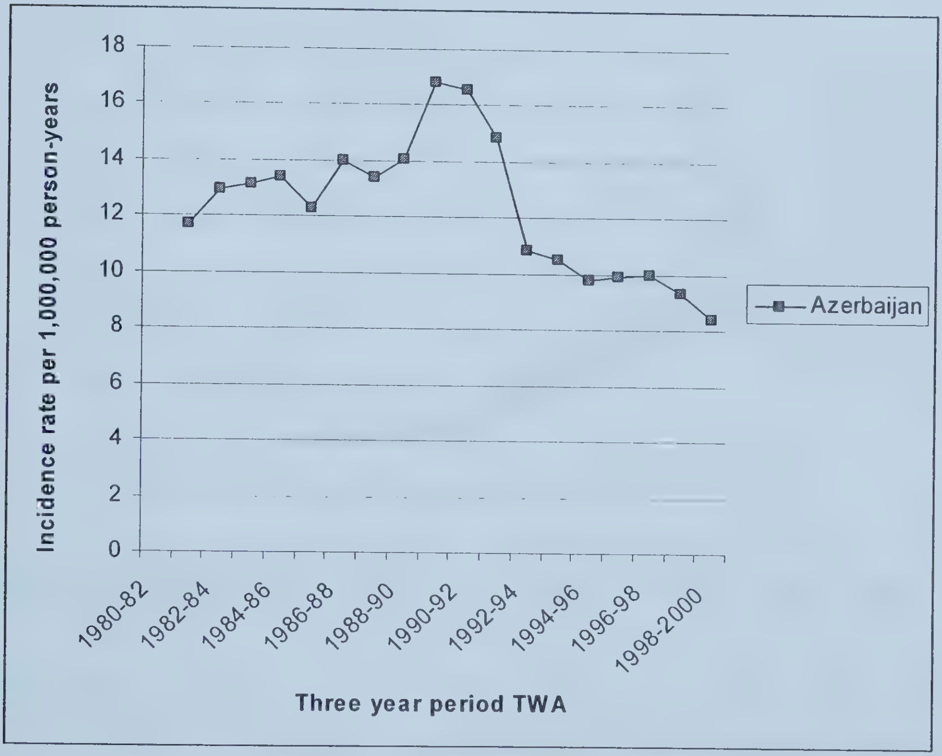

Figure 5.12. Three-year moving time weighted averages (TWA) of crude cancer incidence for Azerbaijan, childhood CNS cancer and leukemia and (ICD-9: 191, 192, 204-208).

5.2.2. Age-Specific Incidence Rates

Age-specific incidence rates were available for only the years 1991-2000 for the nation of Azerbaijan, from 1992-2000 for the cities of Sumgayit and Ganja, and from 1995-2000 for the Lenkoran-Astara region. The age-specific rates are first graphed annually for Azerbaijan (Figure 5.13), but in subsequent figures, 3-year averages of the annual rates are graphed for the following years (1992-1994), (1995-1997), (1998-2000), in order to present a clearer picture of temporal variations in age-specific incidence rates.

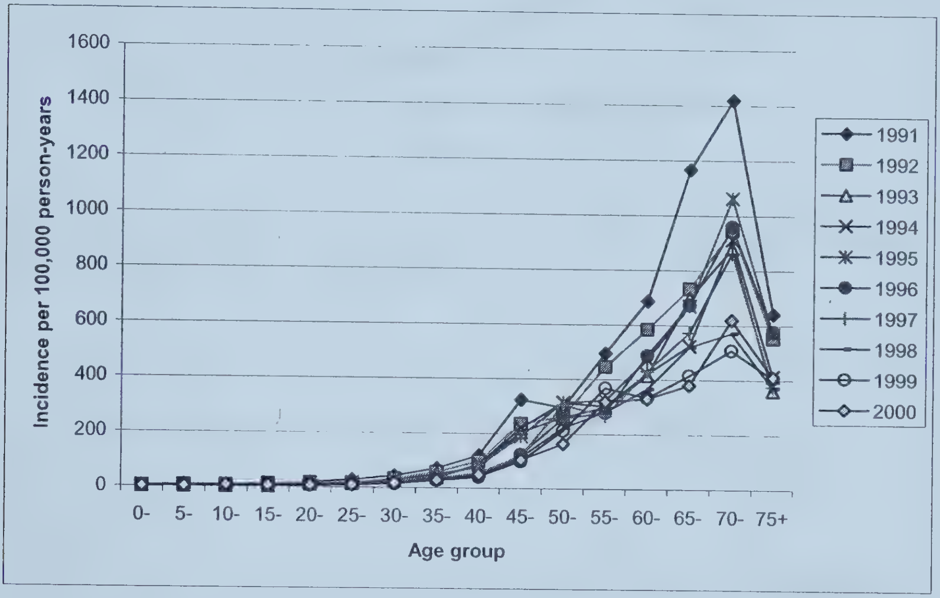

Figure 5.13. Annual age-specific incidence for the nation of Azerbaijan, males, all cancers combined (ICD-9: 140-208), 1991-2000.

Three-year averages of Azeri national male and female age-specific incidence rates for all cancers combined are displayed in Figures 5.14 and 5.15, respectively. For both males and females, reported cancer incidence rises exponentially with age, until the oldest age-group (75+), when a major decrease occurs. Age-specific rates decrease over the study period, with the highest rates occurring in 1992-94 and the lowest rates in 1998-2000. Similar patterns are evident for all of the selected study regions, including Sumgayit (Figs. 5.16, 5.17), Ganja (Figs. 5.18, 5.19) and Lenkoran-Astara (Figs. 5.20, 5.21). An interesting peculiarity is that in most of the study regions during the 1995-97 period, incidence rates in the 55-59 age group are unusually low.

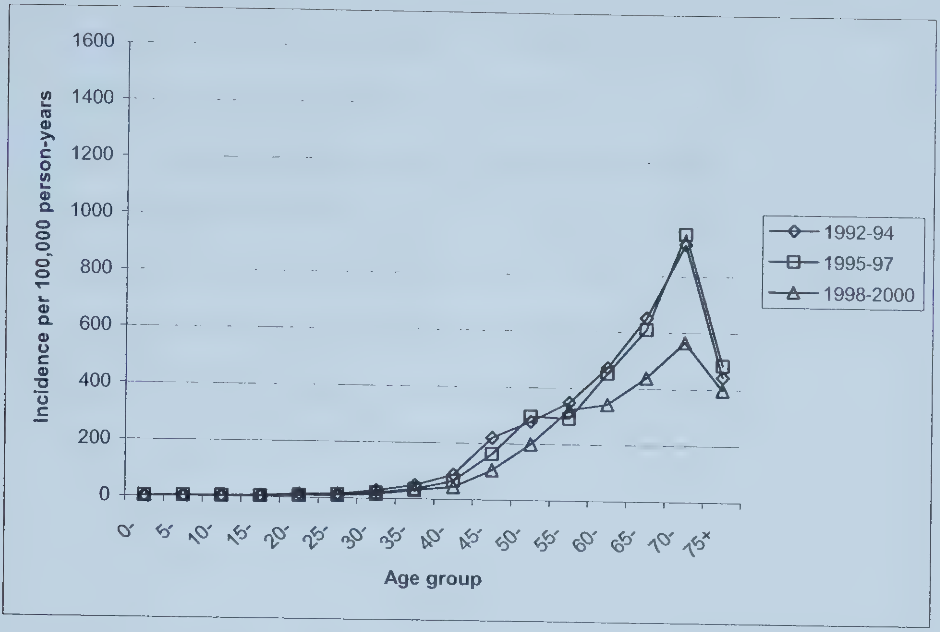

Figure 5.14. Three-year time-weighted averages of age-specific incidence in the nation of Azerbaijan, males, all cancers combined (ICD-9: 140-208).

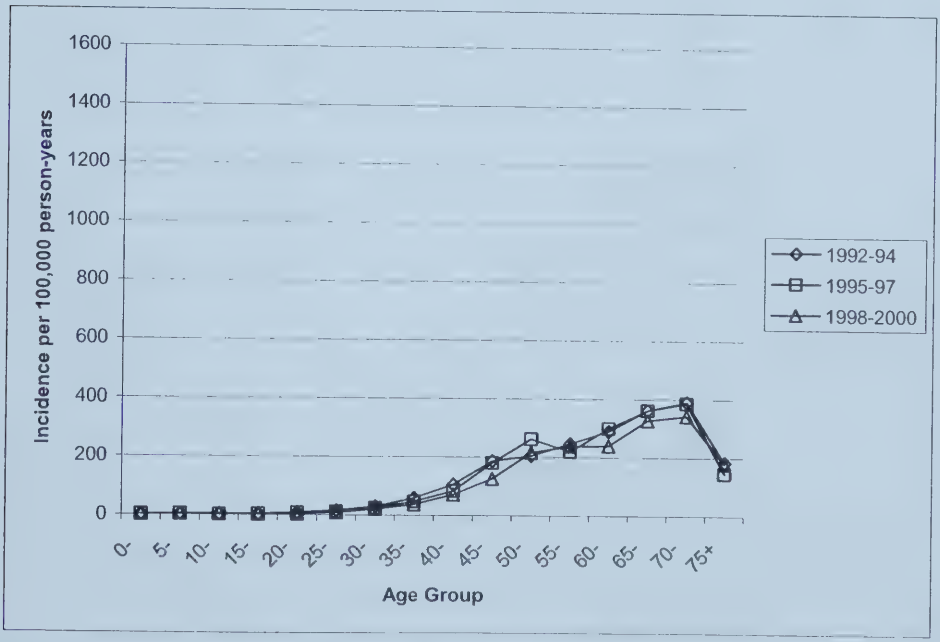

Figure 5.15. Three-year time weighted averages of age-specific incidence in the nation of Azerbaijan, females, all cancers combined (ICD-9: 140-208).

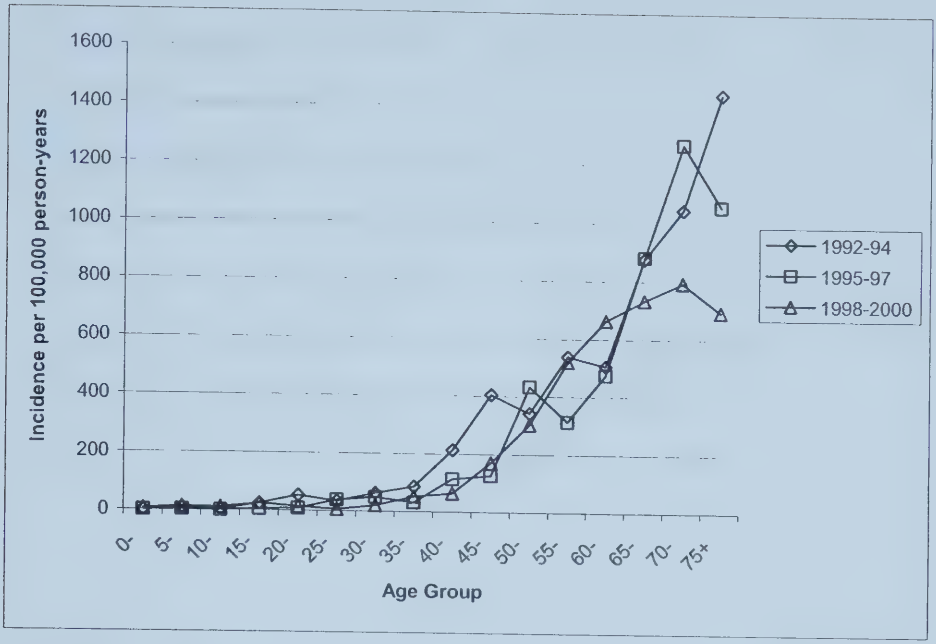

Figure 5.16. Three-year time weighted averages of age-specific incidence in the city of Sumgayit, males, all cancers combined (ICD-9: 140-208).

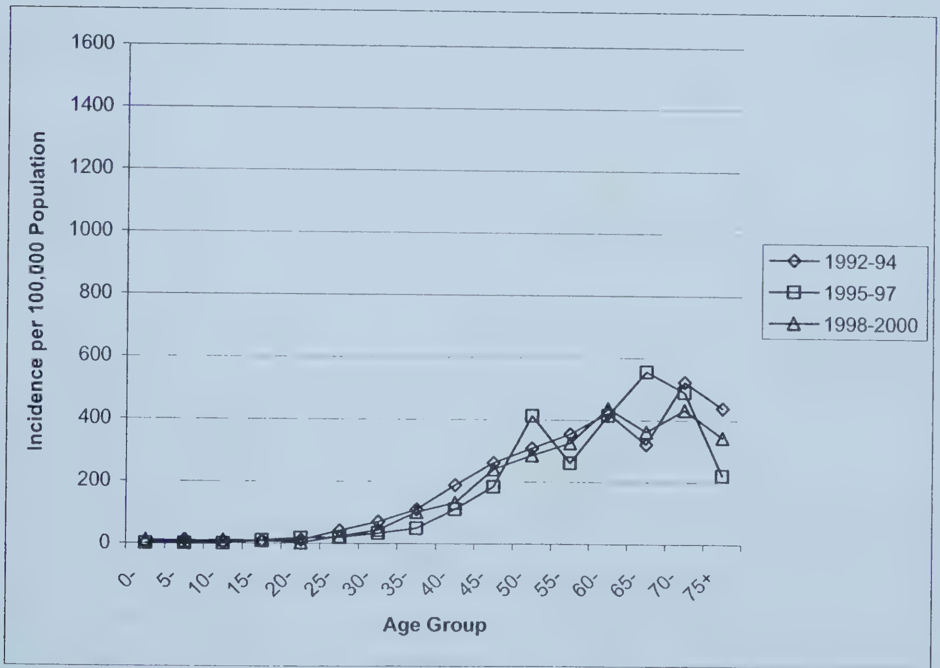

Figure 5.17. Three-year time weighted averages of age-specific incidence in the city of Sumgayit, females, all cancers combined (ICD-9: 140-208).

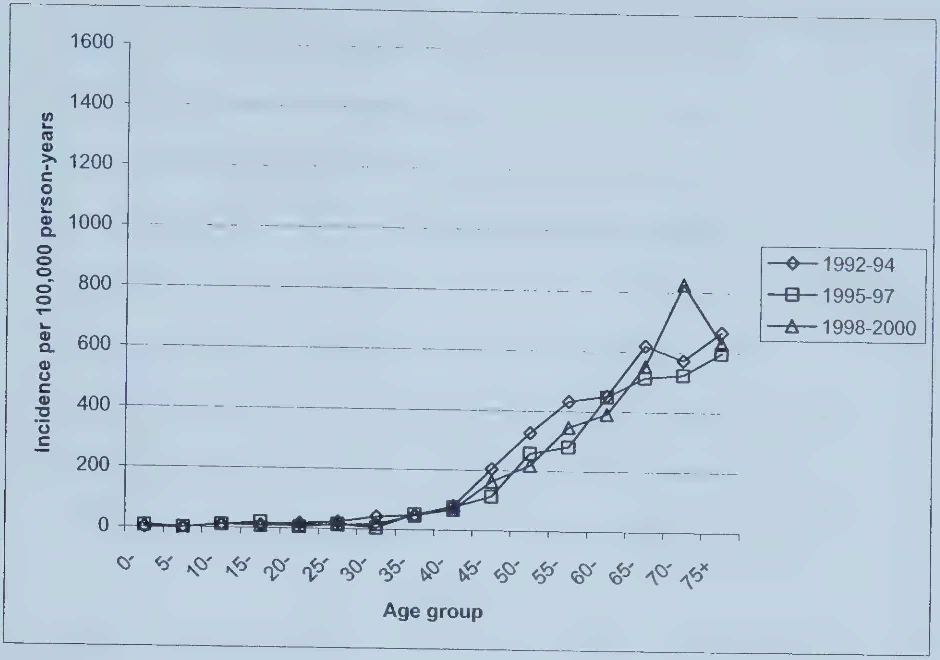

Figure 5.18. Three-year time weighted averages of age-specific incidence in the city of Ganja, males, all cancers combined (ICD-9: 140-208).

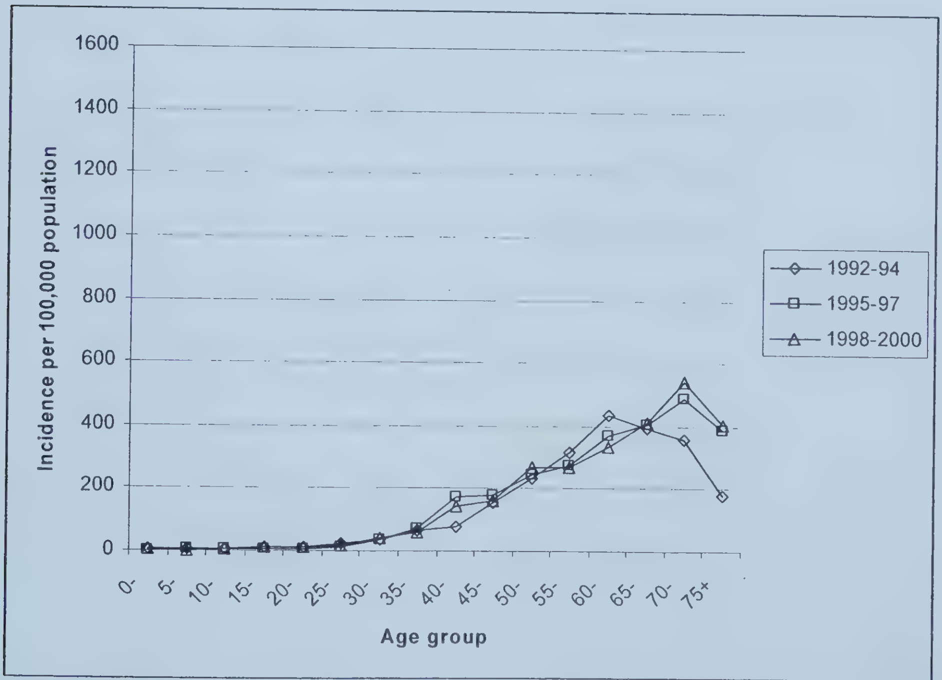

Figure 5.19. Three-year time weighted averages of age-specific incidence in the city of Ganja, females, all cancers combined (ICD-9: 140-208).

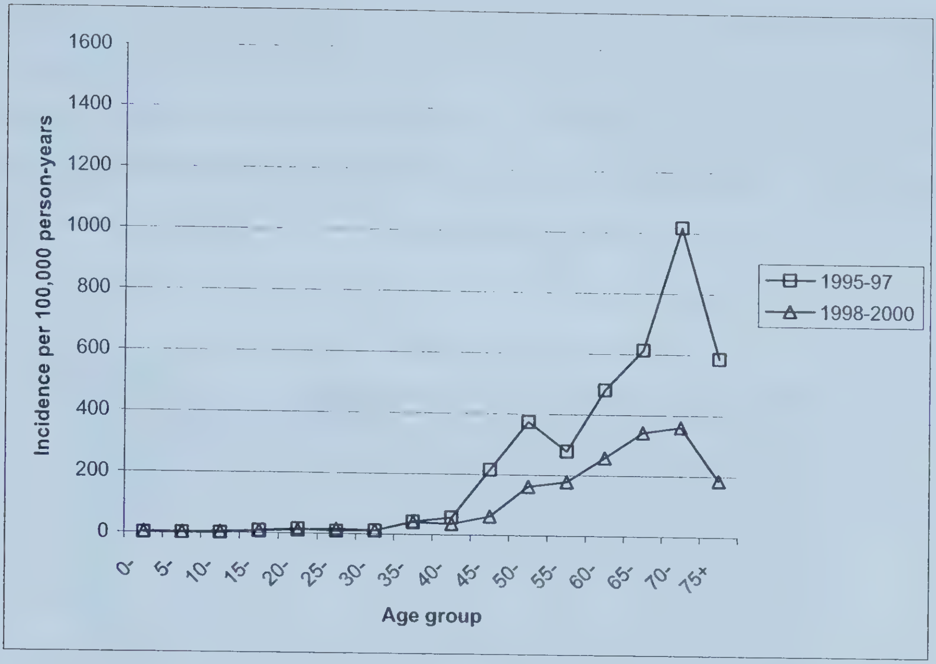

Figure 5.20. Three-year time weighted averages of age-specific incidence in the Lenkoran-Astara region, males, all cancers combined (ICD-9: 140-208).

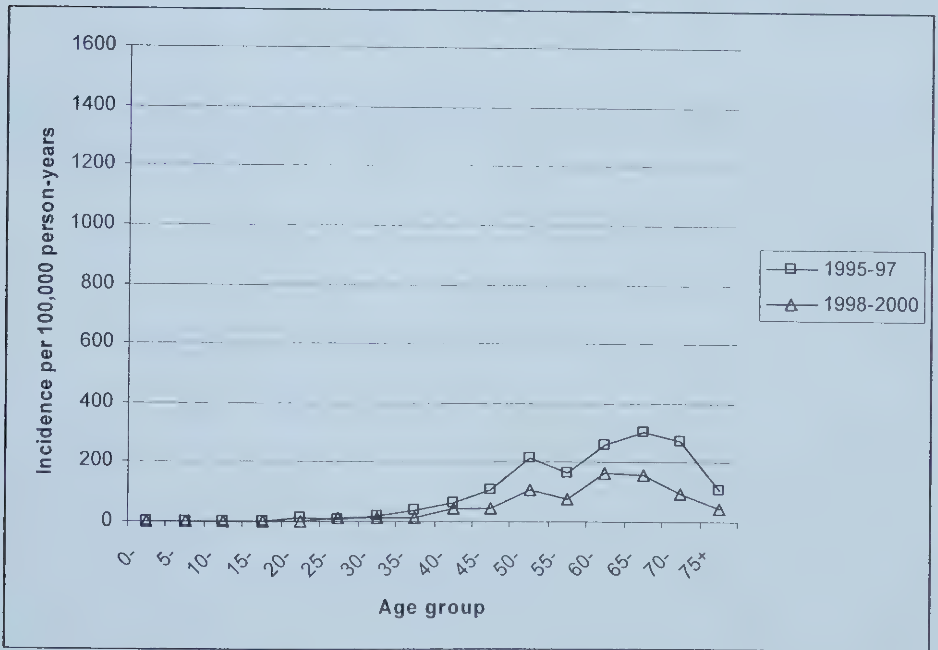

Figure 5.21. Three-year time weighted averages of age-specific incidence in the Lenkoran-Astara region, females, all cancers combined (ICD-9: 140-208).

Age-specific cancer incidence rates in Canada tend to be 4-5 times higher than those in Azerbaijan (Figure 5.22). In stark contrast to the patterns seen in Azeri cancer incidence rates, Canadian rates do not demonstrate major decreases in the oldest age categories. Instead, rates in Canada for both males and females tend to plateau without decreasing in the oldest age groups.

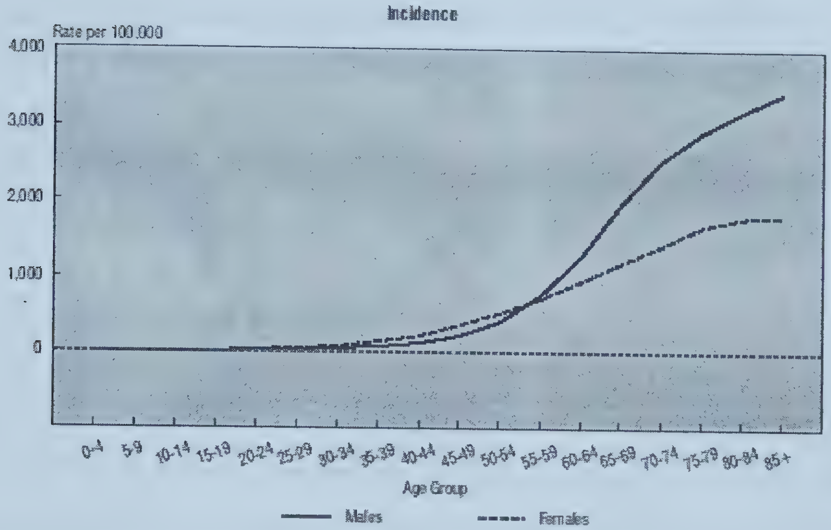

Figure 5.22. Age-specific incidence in Canada in 1998, males and females, all cancers combined (ICD-9: 140-208, excluding 173). (Adapted from National Cancer Institute of Canada: Canadian Cancer Statistics 2002).

5.2.3. Age-Standardized Incidence Rates

Age-standardized cancer incidence rates could be calculated only for the period 1991-2000 because of the unavailability of age and sex-specific data prior to this period. However, even beyond 1991, data are still missing for several years and study regions. Presented below are cancer incidence rates standardized to the world standard population. For a complete listing of age-specific incidence rates, as well as those standardized to both the world standard population and the 1991 Azerbaijan population, please see *Appendix III: Cancer Incidence and Mortality Rates.* The choice of standard population (world standard or 1991 Azeri population) had little effect on the overall patterns of cancer rates witnessed.

All Cancer Sites Combined (ICD-9: 140-208)

For both males (Figure 5.23) and females (Figure 5.24), age-standardized incidence for all cancer sites combined appears to be higher in Sumgayit than in the other study regions, though the difference is more pronounced in males. Also of note is that even the age-standardized incidence rates exhibit a decreasing trend over most of the period 1991-2000, particularly the Azerbaijan national data, similar to the crude rates. Incidence rates for females are lower, and show less variation over time than rates for males.

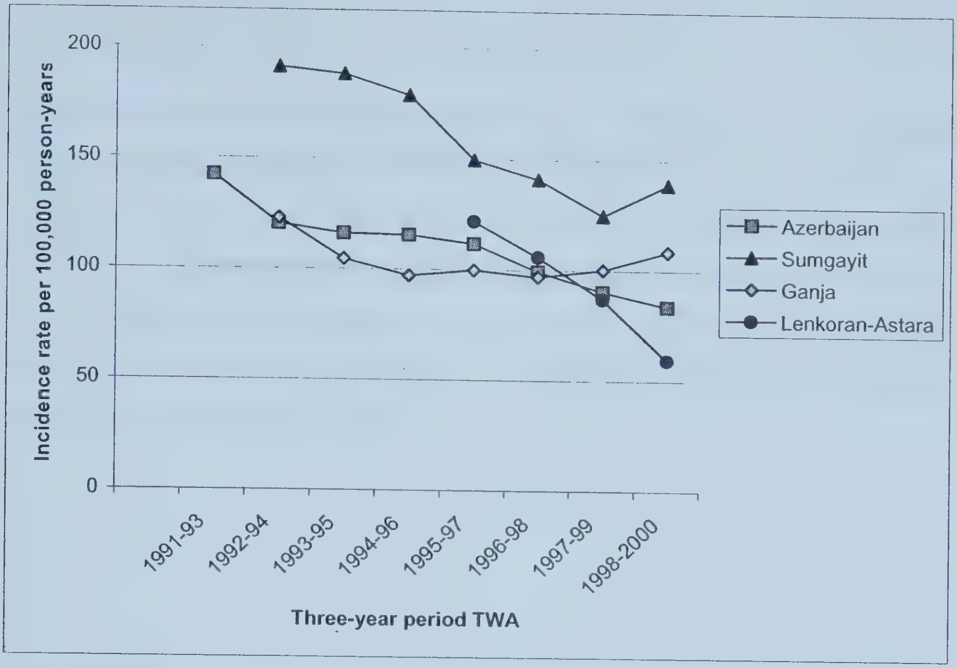

Figure 5.23. Annual age-standardized incidence rates for selected regions of Azerbaijan, males, all cancer sites combined (ICD-9: 140-208).

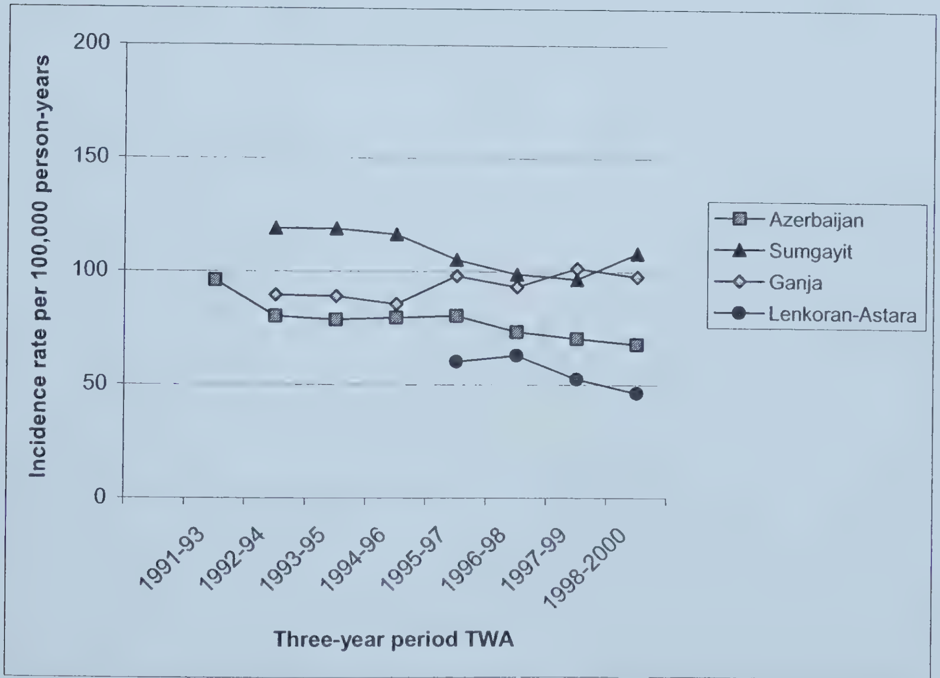

Figure 5.24. Annual age-standardized incidence rates for selected regions of Azerbaijan, females, all cancer sites combined (ICD-9: 140-208).

Cancer of the Larynx (ICD-9: 161)

Annual age-standardized incidence rates for cancer of the larynx in males demonstrate considerable instability (Figure 5.25). For this reason, it is difficult to qualitatively identify any consistent differences between the study regions. Laryngeal cancer incidence in males is greater than in females, typically by a factor of four or five. Female laryngeal cancer incidence rates appear to be more stable than those of the males (Figure 5.26); however, even for females it is difficult to identify any one region as having consistently lower or higher incidence rates.

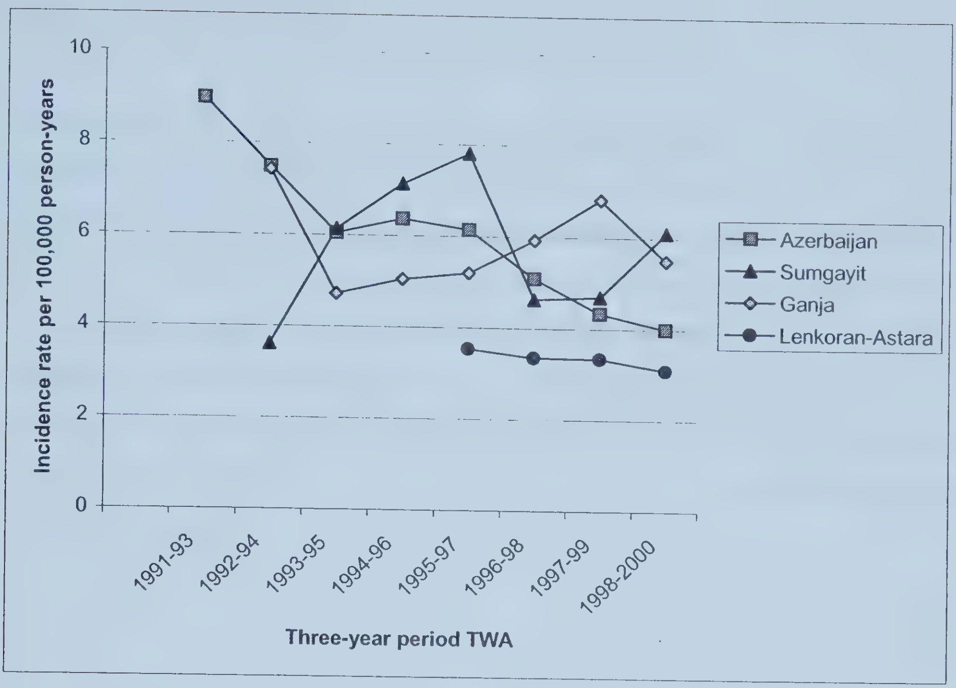

Figure 5.25. Annual age-standardized incidence rates for selected regions of Azerbaijan, males, laryngeal cancer (ICD-9: 161).

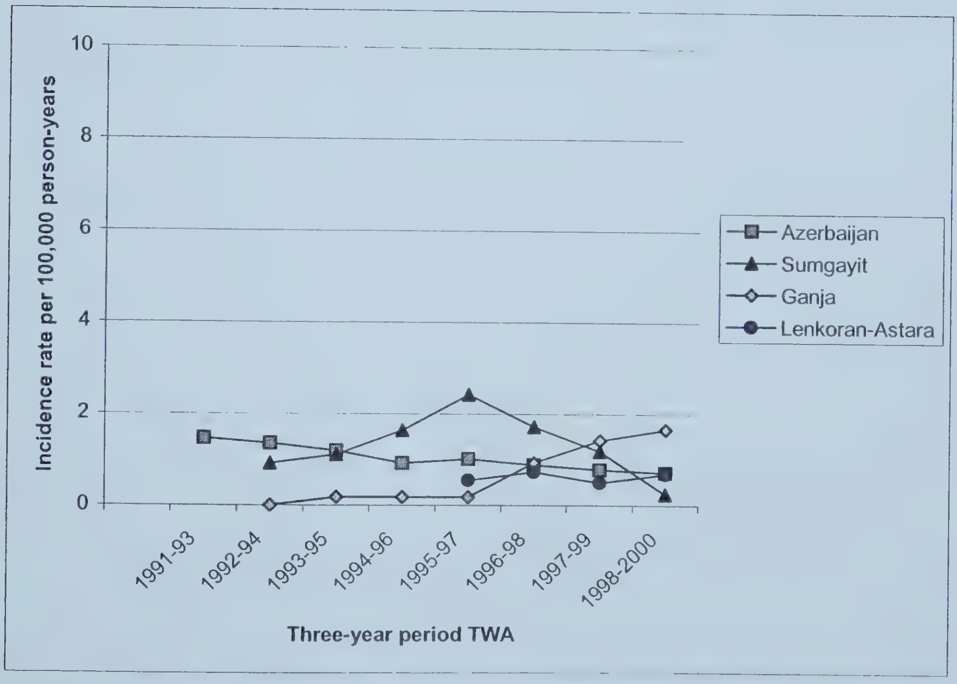

Figure 5.26. Annual age-standardized cancer incidence for selected regions of Azerbaijan, females, laryngeal cancer (ICD-9: 161).

Cancer of the Trachea, Bronchus, and Lung (ICD-9: 162)

Age-standardized incidence rates of lung cancer in males generally show a pattern of decrease over the study period (Figure 5.27). Rates in Sumgayit show some variability, though they are consistently higher than in the comparison regions. Azerbaijan national incidence is consistently lower than both Sumgayit and Ganja, and higher than the Lenkoran-Astara region. Lung cancer rates in males are generally four to five times higher than those in females (Figure 5.28). A decreasing trend in female lung cancer incidence over the study period is not as pronounced as that for males. Among females, Sumgayit shows a pattern of consistently elevated lung cancer incidence relative to the other study regions.

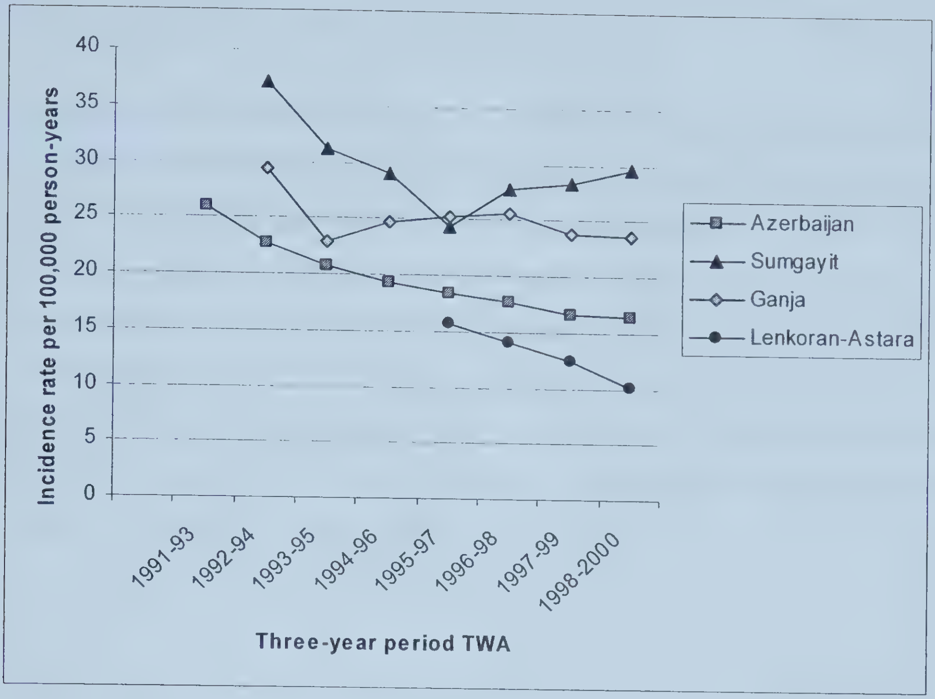

Figure 5.27. Annual age-standardized cancer incidence for selected regions of Azerbaijan, males, cancer of the trachea, bronchus, and lung (ICD-9: 162).

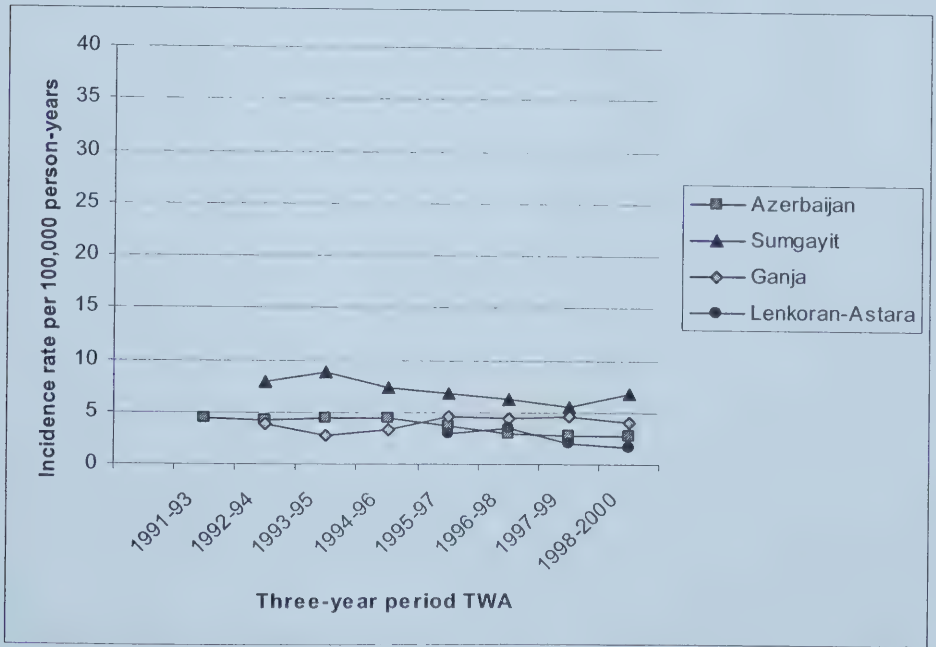

Figure 5.28. Annual age-standardized cancer incidence for selected regions of Azerbaijan, females, cancer of the trachea, bronchus, and lung (ICD-9: 162).

Cancer of the Urinary Bladder (ICD-9: 188)

Male urinary bladder cancer in Sumgayit shows the most elevated incidence of all cancer sites (Figure 5.29). Though the rate in Sumgayit shows major fluctuations, for most of the period 1995-2000, male bladder cancer incidence in Sumgayit is two to three times the national average. Unlike what has been seen for other cancer sites, incidence rates in Ganja are generally below the national averages. Once again, the rates in Lenkoran-Astara are relatively low. National rates for males tend to be four to five times higher than those for females, while the sex ratio for cancer rates in Sumgayit appears to be as high as 6:1 (Figure 5.30). Female bladder cancer incidence in Sumgayit appears elevated relative to the other study regions for all data points but the very last.

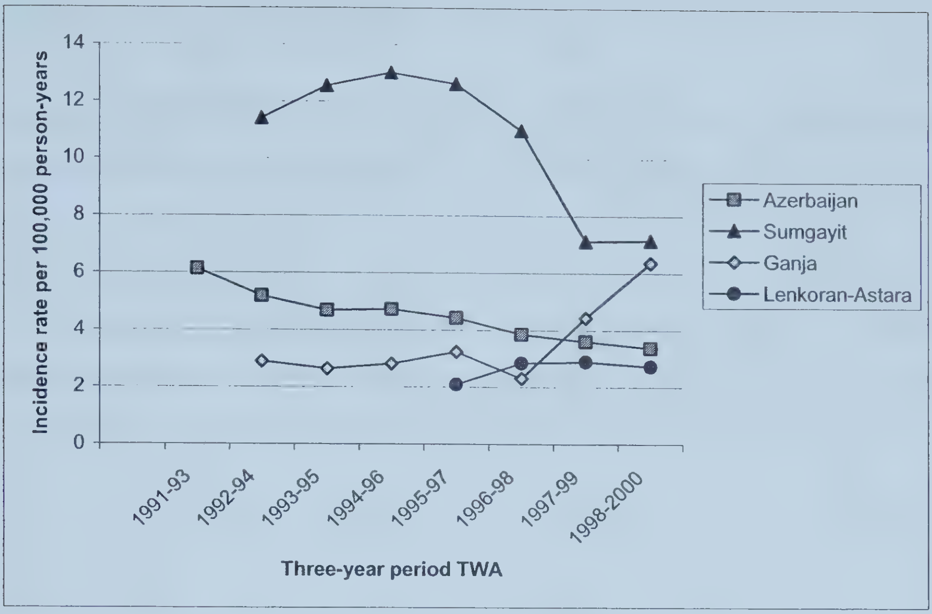

Figure 5.29. Annual age-standardized cancer incidence for selected regions of Azerbaijan, males, cancer of the urinary bladder (ICD-9: 188).

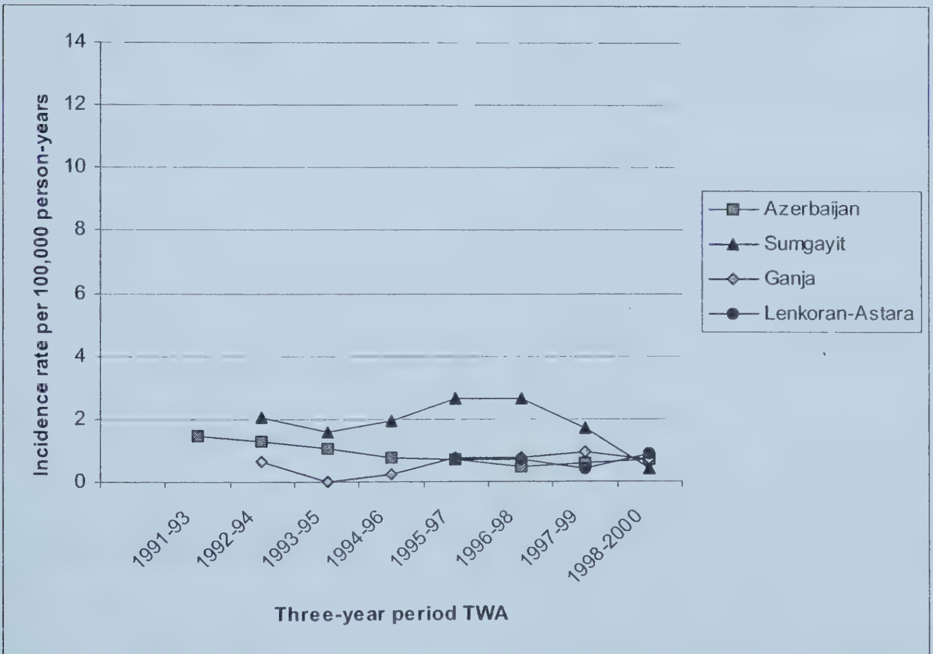

Figure 5.30. Annual age-standardized cancer incidence for selected regions of Azerbaijan, females, cancer of the urinary bladder (ICD-9: 188).

Cancer of the Female Breast (ICD-9: 174)

Age-standardized female breast cancer rates show considerable variation in both the Ganja and Sumgayit rayons (Figure 5.31). Despite instability, female breast cancer incidence would appear to be highest in the Ganja rayon, a pattern peculiar to this cancer site. Azerbaijan national incidence drops in the early 1990s, rebounds through the mid 1990s, and decreases again in the late 1990s. Incidence in Sumgayit is generally higher than national rates, though considerable fluctuation is evident. Once again, cancer rates in Lenkoran-Astara are considerably lower than in the other study regions.

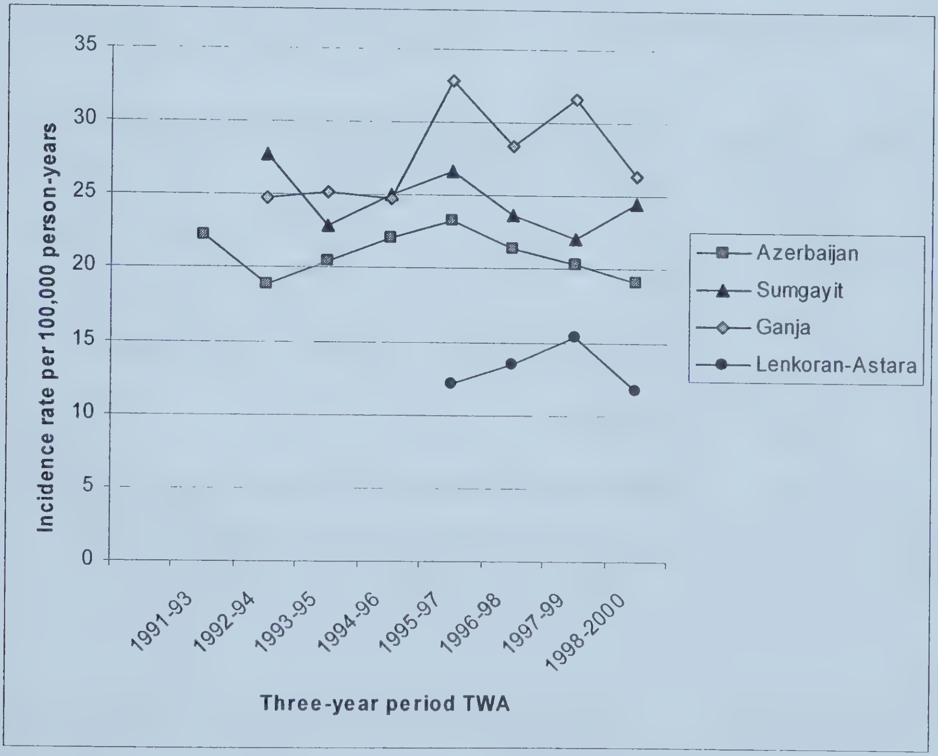

Figure 5.31. Annual age-standardized cancer incidence for selected regions of Azerbaijan, female breast cancer (ICD-9: 174).

5.2.4. Proportional Incidence Ratio (PIR) Analysis

Several results from the PIR analysis of cancer incidence data are noteworthy (Table 5.3). Sumgayit demonstrates a statistically significant higher proportionate incidence from urinary bladder cancer, and a lower proportionate incidence from laryngeal cancer incidence than the national data. Ganja has a lower burden of urinary bladder cancer but a higher burden from female breast cancer than does the nation of Azerbaijan. Lenkoran-Astara displays lower proportions of cancer incidence from each of the selected cancer sites, as a greater fraction of cancers fall in the 'all other cancers' category. The 'all other regions' category displays results very similar to the aggregate national data, which is to be expected given the high degree of overlap in the populations being studied.

Table 5.3. Proportional Incidence Ratio (PIR) analysis of cancer incidence data, 1980-2000.

Cancer Site	***Azerbaijan (reference)***	**Sumgayit**	**Ganja**	**Lenkoran-Astara**	**Other regions**
Larynx (ICD-9: 161)	*1.00*	0.77 (0.66, 0.90)	0.96 (0.82, 1.12)	0.84 (0.60, 1.17)	1.01 (0.98, 1.05)
Trachea, bronchus, lung (ICD-9: 162)	*1.00*	1.05 (0.98, 1.13)	1.11 (1.03, 1.19)	0.75 (0.62, 0.89)	1.00 (0.98, 1.01)
Urinary bladder (ICD-9: 188)	*1.00*	1.33 (1.17, 1.52)	0.83 (0.69, 1.00)	0.73 (0.49, 1.08)	0.99 (0.96, 1.03)
Female breast (ICD-9: 174)	*1.00*	0.94 (0.87, 1.01)	1.29 (1.20, 1.38)	0.80 (0.67, 0.97)	0.99 (0.98, 1.01)
All other cancers (ICD-9: 140-160; 163-173; 175-187; 189-208)	*1.00*	1.00 (0.98, 1.01)	0.95 (0.93, 0.97)	1.09 (1.06, 1.12)	1.00 (1.00, 1.00)

Note: Cancer incidence data are missing for several years and regions, and are therefore not included in this analysis: Ganja 1980, 1984; Lenkoran-Astara 1980, 1983-1994.

5.2.5. Standardized Incidence Ratio (SIR) Analysis

The results of the SIR analysis for the 1995-2000 period are summarized in Table 5.4. For all cancer sites combined (ICD-9: 140-208), incidence in Sumgayit is estimated to be nearly 1.5 times higher than the national average. As is witnessed by the relatively narrow 95% confidence interval, this result is statistically significant. Ganja falls in second place, with a rate nearly 1.25 times higher than the national average. It is

important to note that the confidence intervals for Sumgayit and any of the other regions do not overlap, suggesting that the highest cancer incidence of all regions indeed occurs in Sumgayit. Lenkoran-Astara has significantly lower rates than expected by the national averages.

Table 5.4. Standardized Incidence Ratio (SIR) analysis result summary (1995-2000).

Cancer Site	Region	Incident Cases		SMR		
		Actual	Expected	Estimate	95 % C.I. Lower	95 % C.I. Upper
All Sites ICD-9: 140-208	Azerbaijan	31274	31274.00	**1.00**	-	-
	Sumgayit	1648	1118.19	**1.47**	1.40	1.55
	Ganja	1473	1189.28	**1.24**	1.18	1.30
	Lenkoran-Astara	890	1081.27	**0.82**	0.77	0.88
Larynx ICD-9: 161	Azerbaijan	995	995.00	**1.00**	-	-
	Sumgayit	49	35.58	**1.38**	1.04	1.82
	Ganja	42	37.87	**1.11**	0.82	1.50
	Lenkoran-Astara	23	34.40	**0.67**	0.44	1.01
Lung ICD-9: 162	Azerbaijan	3469	3469.00	**1.00**	-	-
	Sumgayit	200	124.00	**1.61**	1.40	1.85
	Ganja	190	131.82	**1.44**	1.25	1.66
	Lenkoran-Astara	87	119.94	**0.73**	0.59	0.90
Urinary Bladder ICD-9: 188	Azerbaijan	760	760.00	**1.00**	-	-
	Sumgayit	64	27.18	**2.35**	1.84	3.01
	Ganja	37	28.91	**1.28**	0.93	1.77
	Lenkoran-Astara	18	26.28	**0.69**	0.43	1.09
Female Breast ICD-9: 174	Azerbaijan	4292	4292.00	**1.00**	-	-
	Sumgayit	184	153.45	**1.20**	1.04	1.39
	Ganja	233	163.17	**1.43**	1.26	1.62
	Lenkoran-Astara	86	148.40	**0.58**	0.47	0.72

A similar pattern exists for cancer of the larynx (ICD-9: 161), with laryngeal cancer incidence in Sumgayit nearly 1.4 times higher than expected from the national data. This result is of borderline statistical significance, though the lack of stronger evidence may simply be owing to the smaller numbers of cases involved. The estimate for Ganja is slightly above unity, though the result is not significant. Once again, Lenkoran-Astara has lower rates than other regions.

Cancer of the trachea, bronchus, and lung (ICD-9: 162) is significantly elevated in Sumgayit relative to the national average. Ganja follows as a not too distant second with also higher than expected morbidity, though it must be noted that the confidence intervals for Ganja and Sumgayit do overlap. Incidence in Lenkoran-Astara is lower than expected.

Urinary bladder cancer incidence (ICD-9: 188) in Sumgayit is dramatically elevated relative to national data, nearly 2.5 times higher. The confidence interval for Sumgayit is wide, though it does not overlap those from any other study region. The incidence of bladder cancer in Ganja is not elevated significantly. As has been the case with the other cancer sites, urinary bladder cancer incidence in Lenkoran-Astara is lower than expected, though the result is not statistically significant.

Unlike other cancer sites, female breast cancer (ICD-9: 174) incidence appears to be only moderately elevated in Sumgayit. In fact, breast cancer incidence is highest in the Ganja rayon, nearly one and a half times greater than national rates. The result for Ganja is highly significant relative to national data, though its confidence interval does overlap that of Sumgayit. The SIR for Lenkoran-Astara is significantly below unity, and suggests that female breast cancer rates are lower in that region.

5.2.6. Poisson Regression Analysis – Crude Incidence Data (1980-2000)

The results of several univariate Poisson regression analyses utilizing available crude cancer incidence data over the entire study period (1980-2000) for each of the selected regions are summarized below (Table 5.5). The models examined are listed below:

Area: $\lambda = \alpha + \beta_1 \text{Area}$

Year: $\lambda = \alpha + \beta_1 \text{Year}$

Sex: $\lambda = \alpha + \beta_1 \text{Sex}$

Age: $\lambda = \alpha + \beta_1 \text{Age}$

Sumgayit demonstrates significantly elevated crude incidence for cancers of the trachea, bronchus & lung, urinary bladder, and all cancers combined. Crude female breast cancer incidence in Sumgayit is moderately elevated. Ganja demonstrates elevated risk of female breast cancer, and shows moderate increases in cancer of the trachea, bronchus & lung, and all cancers combined relative to the reference area. For each of the cancer sites, incidence in Lenkoran-Astara is much lower than any of the other regions being compared.

Table 5.5. Univariate Poisson regression analyses utilizing available crude cancer incidence data for selected study regions, 1980-2000.

Cancer Site	Region	Rate Ratio		
		RR	95 % C.I.	
			Lower	Upper
All cancers	*Other regions*	**1.00**	-	-
ICD-9: 140-208	Sumgayit	**1.22**	1.19	1.26
	Ganja	**1.04**	1.01	1.07
	Lenkoran-Astara	**0.67**	0.64	0.71
Larynx	*Other regions*	**1.00**	-	-
ICD-9: 161	Sumgayit	**0.93**	0.79	1.10
	Ganja	**0.98**	0.84	1.15
	Lenkoran-Astara	**0.56**	0.40	0.78
Trachea, bronchus & lung	*Other regions*	**1.00**	-	-
ICD-9: 162	Sumgayit	**1.30**	1.20	1.40
	Ganja	**1.16**	1.07	1.25
	Lenkoran-Astara	**0.50**	0.42	0.61
Urinary bladder	*Other regions*	**1.00**	-	-
ICD-9: 188	Sumgayit	**1.64**	1.43	1.89
	Ganja	**0.87**	0.72	1.05
	Lenkoran-Astara	**0.49**	0.33	0.74
Female breast	*Other regions*	**1.00**	-	-
ICD-9: 174	Sumgayit	**1.16**	1.06	1.26
	Ganja	**1.35**	1.25	1.46
	Lenkoran-Astara	**0.55**	0.45	0.66

*Note: Crude incidence data for Ganja were missing for the years 1980 and 1984, and for the years 1980, 1983-1994 in the Lenkoran-Astara study region.

5.2.7. Poisson Regression Analysis – Age-Sex Specific Data (1995-2000)

For the period where age- and sex-specific data were available for all regions (1995-2000), two separate result summaries are provided for each of the selected cancer sites: 1) several descriptive variable-by-variable univariate analyses, and 2) a single multivariate model.

All Cancer Sites Combined (ICD-9: 140-208)

Descriptive Univariate Analysis

The descriptive univariate analyses for each of the variables: area, year, sex, and age group are summarized in a single table (Table 5.6). The Poisson regression models for the descriptive univariate analyses of each of the selected cancer sites can be summarized as follows:

Area: $\lambda = \alpha + \beta_1\text{Area}$

Year: $\lambda = \alpha + \beta_1\text{Year}$

Sex: $\lambda = \alpha + \beta_1\text{Sex}$

Age: $\lambda = \alpha + \beta_1\text{Age}$

The univariate Poisson regression analysis for "area" yields a similar result to the SIR analysis accomplished previously, with Sumgayit once again demonstrating the highest cancer incidence rates. Ganja follows in second place, also with a rate ratio greater than the reference area (other regions). For clarity, the "other regions" category refers to all regions in Azerbaijan excluding the four regions selected for the study: Sumgayit, Ganja, Lenkoran and Astara. Lenkoran-Astara has a rate ratio below one, suggesting that in this region incidence of all cancers combined is lower than that in the remainder of the country.

The model for "year" uses 1995 as the reference category. All rate ratios for successive years are below unity, and show a pattern of decrease, suggesting that cancer rates have consistently decreased over the period 1995-2000 in all regions of Azerbaijan.

The model suggests that males have a slightly increased risk of cancer incidence relative to females, when considering all sites combined. As expected, rate ratios increase dramatically with membership in an older age group.

Table 5.6. Descriptive results of univariate Poisson regression analyses for incidence of all cancer sites combined (ICD-9: 140-208).

Model	Rate Ratio (RR)		
	Estimate	95% CI	
		Lower	Upper
Area			
Other regions	*1.00*	-	-
Sumgayit	1.51	1.43	1.58
Ganja	1.27	1.20	1.34
Lenkoran-Astara	0.84	0.79	0.90
Year			
1995	*1.00*	-	-
1996	0.87	0.84	0.91
1997	0.83	0.80	0.86
1998	0.76	0.73	0.78
1999	0.72	0.69	0.75
2000	0.74	0.71	0.77
Sex			
Female	*1.00*	-	-
Male	1.10	1.07	1.12
Age Group			
0-14	0.32	0.29	0.35
15-34	*1.00*	-	-
35-54	8.22	7.81	8.65
55+	32.21	30.68	33.82

The final model chosen for all cancer sites combined incorporates terms for each of the following variables: area, year, sex, and age. Interaction terms are also included for age*sex, and area*year:

$\lambda = \alpha + \beta_1 Area + \beta_2 Year + \beta_3 Sex + \beta_4 Age + \beta_5 Age*Sex + \beta_6 Area*Year$

Because of the area*year interaction, rate ratios for each of the study regions have been stratified by year (Table 5.7). For all years except 1997, Sumgayit has the highest rate ratios of any of the comparison regions. Ganja generally exhibits the next highest incidence, though for most years not statistically different than the reference area. Lenkoran-Astara has rate ratios below unity for all years except 1997.

Table 5.7. Annual rate ratios for selected regions in Azerbaijan, incidence of all cancers combined (ICD-9: 140-208).

Year	Region							
	Other regions		Sumgayit		Ganja		Lenkoran-Astara	
1995	1.00	-	1.27	(1.12, 1.43)	1.01	(0.89, 1.15)	0.72	(0.61, 0.84)
1996	0.85	(0.82, 0.88)	1.20	(1.06, 1.35)	0.89	(0.78, 1.02)	0.85	(0.73, 0.98)
1997	0.79	(0.76, 0.83)	0.98	(0.86, 1.12)	1.07	(0.94, 1.21)	0.88	(0.76, 1.01)
1998	0.74	(0.71, 0.77)	1.16	(1.03, 1.32)	0.91	(0.79, 1.04)	0.60	(0.50, 0.71)
1999	0.72	(0.69, 0.75)	1.13	(0.99, 1.28)	1.08	(0.95, 1.22)	0.48	(0.40, 0.58)
2000	0.72	(0.69, 0.74)	1.44	(1.29, 1.61)	1.15	(1.02, 1.30)	0.53	(0.44, 0.63)

Cancer incidence for males versus females is very similar for all age groups except for the 55+ age group, where cancer incidence for males is over 1.5 times greater (Table 5.8). Similar patterns of increasing cancer risk by age group are evident for both males and females.

Table 5.8. Sex-specific cancer incidence rate ratios by age for the nation of Azerbaijan, all cancer sites combined (ICD-9: 140-208).

Age	Females		Males		Sex Ratio
	RR	95% CI	RR	95% CI	(M:F)
0-14	1.00	-	1.06	(0.89, 1.26)	1.06
15-34	3.31	(2.87, 3.81)	3.14	(2.72, 3.63)	0.95
35-54	29.19	(25.65, 33.23)	24.08	(21.13, 27.43)	0.82
55+	81.68	(71.85, 92.85)	132.60	(116.68, 150.69)	1.62

Cancer of the Larynx (ICD-9: 161)

Descriptive Univariate Analysis

The results of the descriptive univariate Poisson analysis for cancer of the larynx are summarized below (Table 5.9). Similar to the results of the SIR analysis, Sumgayit shows elevated incidence of laryngeal cancer, albeit with a relatively wide confidence interval. None of the other regions have cancer risk significantly different from the rest of the country, though the same relative rankings occur as for all cancer sites combined. Incidence in Sumgayit is highest, cancer risk for Ganja is slightly higher than the rest of the country, and Lenkoran-Astara is lower. Analysis of the "year" variable shows a consistent decrease in cancer rates from 1995 onward, with a mild recovery in 2000. Consideration of sex shows that males are at an approximately five times increased risk of laryngeal cancer than females. Finally, the risk of laryngeal cancer increases exponentially with age.

Table 5.9. Descriptive results of univariate Poisson regression analyses for incidence of cancer of the larynx (ICD-9: 161).

Model	Rate Ratio (RR)		
	Estimate	95% CI	
		Lower	Upper
Area			
Other regions	*1.00*	-	-
Sumgayit	1.39	1.04	1.85
Ganja	1.12	0.82	1.53
Lenkoran-Astara	0.67	0.44	1.02
Year			
1995	*1.00*	-	-
1996	0.85	0.70	1.03
1997	0.74	0.61	0.91
1998	0.63	0.51	0.78
1999	0.57	0.46	0.70
2000	0.62	0.50	0.76
Sex			
Female	*1.00*	-	-
Male	5.03	4.27	5.94
Age Group			
0-14	0.07	0.01	0.52
15-34	*1.00*	-	-
35-54	23.87	14.39	39.61
55+	131.97	80.43	216.55

Multivariate Analysis

The final multivariate model selected for laryngeal cancer incidence incorporates terms for the variables area, year, age, sex, and a term for the age*sex interaction:

$$\lambda = \alpha + \beta_1 Area + \beta_2 Year + \beta_3 Sex + \beta_4 Age + \beta_5 Age*Sex$$

After accounting for year, age, sex, and the age*sex interaction, Sumgayit still demonstrates an elevated laryngeal cancer risk compared to the reference area (Table 5.10). Though the estimate for Ganja is slightly above, and that for Lenkoran-Astara is slightly below unity, the results are not statistically significant. A pattern of decreasing risk over time is evident for the period 1995-1999, with only the year 2000 showing a moderate increase in cancer risk relative to the previous year.

Table 5.10. Cancer incidence rate ratios for area and year variables, cancer of the larynx (ICD-9: 161).

Variable	Rate Ratio (RR)	95% CI
Area		
Other regions	1.00	-
Sumgayit	1.39	(1.04, 1.85)
Ganja	1.12	(0.82, 1.52)
Lenkoran-Astara	0.67	(0.45, 1.02)
Year		
1995	1.00	-
1996	0.84	(0.69, 0.98)
1997	0.73	(0.59, 0.89)
1998	0.64	(0.52, 0.78)
1999	0.58	(0.47, 0.73)
2000	0.64	(0.52, 0.79)

Cancer risk ranges from 3.5 (35-54 age group) to over 7 times greater (55+ age group) for males than females (Table 5.11). The risk of laryngeal cancer incidence increases exponentially with age for men and women.

Table 5.11. Sex-specific cancer incidence rate ratios by age for the nation of Azerbaijan, cancer of the larynx (ICD-9: 161).

Age	Females		Males		Sex Ratio (M:F)
	RR	95% CI	RR	95% CI	
0-34	1.00	-	4.57	(1.31, 15.91)	4.57
35-54	53.84	(16.84, 172.21)	191.14	(61.06, 598.28)	3.55
55+	174.83	(55.55, 550.23)	1293.23	(415.97, 4020.64)	7.40

Cancer of the Trachea, Bronchus, and Lung (ICD-9: 162)

Descriptive Univariate Analysis

The descriptive univariate analyses for trachea, bronchus, and lung cancer incidence are summarized below (Table 5.12). Incidence in Sumgayit and Ganja is significantly elevated relative to the remainder of the country. Though the rate ratio estimate is highest for Sumgayit, the confidence intervals of Ganja and Sumgayit overlap considerably. Lenkoran-Astara demonstrates rates significantly below the national average. Lung cancer incidence varies by year, though no consistent pattern of increase or decrease is evident. Males have an incidence of lung cancer nearly 4.5 times greater than females. As expected, lung cancer incidence increases exponentially with age.

Table 5.12. Descriptive results of univariate Poisson regression analyses for cancer incidence of the trachea, bronchus, and lung (ICD-9: 162).

Model	Rate Ratio (RR)		
	Estimate	95% CI	
		Lower	Upper
Area			
Other regions	*1.00*	-	-
Sumgayit	1.67	1.45	1.92
Ganja	1.49	1.29	1.73
Lenkoran-Astara	0.75	0.61	0.93
Year			
1995	*1.00*	-	-
1996	0.90	0.90	1.12
1997	0.78	0.78	0.99
1998	0.86	0.77	0.97
1999	0.83	0.74	0.93
2000	0.94	0.84	1.05
Sex			
Female	*1.00*	-	-
Male	4.41	4.05	4.80
Age Group			
0-14	0.05	0.01	0.19
15-34	*1.00*	-	-
35-54	22.50	16.79	30.15
55+	160.71	120.81	213.77

Multivariate Analysis

The final multivariate model selected for cancer of the trachea, bronchus, and lung incorporates the terms: area, year, sex, age, and the age*sex interaction:

$$\lambda = \alpha + \beta_1 Area + \beta_2 Year + \beta_3 Sex + \beta_4 Age + \beta_5 Age*Sex$$

Lung cancer incidence in both Sumgayit and Ganja is significantly elevated relative to the rest of the country, though not significantly different from each other (Table 5.13). Lenkoran-Astara, in contrast, demonstrates significantly lower rates. Though incidence is substantially lower for the period 1997-1999, in the year 2000 incidence rates return to 1995 levels.

Table 5.13. Cancer incidence rate ratios for area and year variables, cancer of the trachea, bronchus, and lung (ICD-9: 162).

Variable	Rate Ratio (RR)	95% CI
Area		
Other regions	*1.00*	-
Sumgayit	1.67	(1.44, 1.92)
Ganja	1.49	(1.29, 1.73)
Lenkoran-Astara	0.75	(0.61, 0.93)
Year		
1995	*1.00*	-
1996	0.99	(0.89, 1.11)
1997	0.86	(0.77, 0.97)
1998	0.87	(0.78, 0.98)
1999	0.87	(0.77, 0.97)
2000	0.98	(0.88, 1.10)

Males show increased risk for cancer of the trachea, bronchus, and lung for all age groups, ranging from a low of 2.5 times higher in the 0-34 age group, to a high of 5.7 times higher in the 55+ age group (Table 5.14). For both males and females, cancer risk increases exponentially with age.

Table 5.14. Sex-specific cancer incidence rate ratios by age for the nation of Azerbaijan, cancer of the trachea, bronchus, and lung (ICD-9: 162).

Age	Females		Males		Sex Ratio
	RR	95% CI	RR	95% CI	(M:F)
0-34	1.00	-	2.52	(1.36, 4.68)	2.52
35-54	27.45	(15.82, 47.64)	122.12	(71.84, 207.59)	4.45
55+	172.55	(101.48, 293.41)	983.09	(581.27, 1662.68)	5.70

Cancer of the Urinary Bladder (ICD-9: 188)

Descriptive Univariate Analysis

Results of the univariate Poisson regression analysis for urinary bladder cancer incidence are shown below (Table 5.15). Bladder cancer incidence in Sumgayit is dramatically higher than the rest of the country. Ganja also shows evidence of increased bladder cancer incidence, and Lenkoran-Astara demonstrates lower bladder cancer incidence than the rest of the country, though the results are not statistically significant. Confidence intervals for all rate ratios are large, likely the result of stochastic variation involving small numbers of cases. All years following 1995 show lower cancer incidence rates, though a temporal trend is not clear. Males show an approximately 4.5 times higher incidence of bladder cancer than females. Urinary bladder cancer incidence rates increase exponentially with age.

Table 5.15. Descriptive results of univariate Poisson regression analyses for urinary bladder cancer incidence (ICD-9: 188).

Model	Rate Ratio (RR)		
	Estimate	95% CI	
		Lower	Upper
Area			
Other regions	*1.00*	-	-
Sumgayit	2.49	1.93	3.22
Ganja	1.36	0.97	1.89
Lenkoran-Astara	0.72	0.45	1.16
Year			
1995	*1.00*	-	-
1996	0.61	0.61	0.96
1997	0.51	0.51	0.82
1998	0.66	0.52	0.83
1999	0.72	0.57	0.91
2000	0.62	0.48	0.78
Sex			
Female	*1.00*	-	-
Male	4.47	3.73	5.37
Age Group			
0-14	0.11	0.01	0.86
15-34	*1.00*	-	-
35-54	21.60	11.36	41.06
55+	172.57	92.39	322.34

Multivariate Analysis

The final multivariate model selected for urinary bladder cancer includes the terms: area, year, sex, and age: $\lambda = \alpha + \beta_1\text{Area} + \beta_2\text{Year} + \beta_3\text{Sex} + \beta_4\text{Age}$.

Bladder cancer incidence in Sumgayit is nearly 2.5 times higher than the rest of the country (Table 5.16). Ganja also shows elevated incidence, though the confidence interval does includes unity, and the rates are significantly lower than those in Sumgayit. The estimate for Lenkoran-Astara suggests decreased bladder cancer risk in that region, even though the result is non-significant. Though no consistent temporal trend is evident, bladder cancer incidence for the years 1996-2000 is significantly lower than the incidence in 1995. Males demonstrate a nearly 5.5 times higher risk of bladder cancer incidence than females. Bladder cancer incidence increases exponentially with age.

Table 5.16. Cancer incidence rate ratios for selected regions of Azerbaijan, cancer of the urinary bladder (ICD-9: 188).

Variable	Rate Ratio (RR)	95% CI
Area		
Other regions	*1.00*	-
Sumgayit	2.49	(1.93, 3.22)
Ganja	1.35	(0.97, 1.88)
Lenkoran-Astara	0.72	(0.45, 1.16)
Year		
1995	*1.00*	-
1996	0.75	(0.60, 0.95)
1997	0.63	(0.50, 0.80)
1998	0.66	(0.52, 0.84)
1999	0.76	(0.60, 0.96)
2000	0.65	(0.51, 0.83)
Sex		
Female	*1.00*	-
Male	5.48	(4.57, 6.58)
Age Group		
0-34	*1.00*	-
35-54	39.02	(21.10, 72.15)
55+	333.55	(183.74, 605.53)

Cancer of the Female Breast (ICD-9: 174)

Descriptive Univariate Analysis

Female breast cancer in Sumgayit is only moderately elevated relative to the rest of the country (Table 5.17). In fact, the highest estimate of breast cancer incidence occurs in Ganja, though it is not significantly higher than Sumgayit. Lenkoran-Astara has a much lower than expected incidence of breast cancer, nearly one-half that of the rest of the country. Breast cancer rates show consistent decreases over the study period, though a trend toward stabilization seems evident. Breast cancer incidence increases exponentially between the 15-34 and 35-54 age groups, though only a doubling is seen between the 35-54 and 55+ age groups.

Table 5.17. Descriptive results of univariate Poisson regression analysis for female breast cancer incidence (ICD-9: 174).

Model	Rate Ratio (RR)		
	Estimate	95% CI	
		Lower	Upper
Area			
Other regions	*1.00*	-	-
Sumgayit	1.21	1.04	1.40
Ganja	1.44	1.27	1.65
Lenkoran-Astara	0.59	0.47	0.72
Year			
1995	*1.00*	-	-
1996	0.92	0.84	1.02
1997	0.87	0.79	0.97
1998	0.81	0.73	0.89
1999	0.79	0.72	0.88
2000	0.78	0.70	0.87
Age Group			
0-14	0.01	0.00	0.04
15-34	*1.00*	-	-
35-54	12.81	11.14	14.74
55+	26.07	22.70	29.95

Multivariate Analysis

The final Poisson model for female breast cancer includes terms for area, year and age: $\lambda = \alpha + \beta_1\text{Area} + \beta_2\text{Year} + \beta_3\text{Age}$.

In a slightly different pattern than the other selected cancer sites, Ganja demonstrates the highest risk of female breast cancer, followed by Sumgayit (Table 5.18). Though the confidence intervals for the two regions overlap a great deal, the point estimate for Ganja is considerably higher. Breast cancer risk in Lenkoran-Astara is lower than the rest of the nation. Breast cancer incidence shows major decreases over the period 1995-1997, though rates appear to stabilize in the last three years. As with all of the other selected cancer sites, breast cancer risk increases substantially with age.

Table 5.18. Cancer incidence rate ratios for selected regions of Azerbaijan, cancer of the female breast (ICD-9: 174).

Variable	Rate Ratio (RR)	95% CI
Area		
Other regions	*1.00*	-
Sumgayit	1.21	(1.04, 1.40)
Ganja	1.44	(1.26, 1.65)
Lenkoran-Astara	0.59	(0.47, 0.72)
Year		
1995	*1.00*	-
1996	0.91	(0.83, 1.01)
1997	0.86	(0.77, 0.95)
1998	0.80	(0.73, 0.89)
1999	0.80	(0.72, 0.89)
2000	0.78	(0.70, 0.86)
Age Group		
0-34	*1.00*	-
35-54	23.95	(20.83, 27.55)
55+	48.27	(42.05, 55.42)

5.2.8. Temporal Trends

Crude cancer incidence in Azerbaijan tends to show a consistent pattern when graphed over time (Figures 5.6–5.11). Incidence rates generally show a period of stability or moderate increase during the early and mid 1980s. In the late 1980s incidence tends to show a noticeable increase, followed by a peak in the in the early 1990s. From this point, incidence decreases quite sharply until the mid or late 1990s, when rates begin to stabilize, or even show moderate increases. This pattern is most evident for the Azeri national data, though similar trends are recurrent in both Sumgayit and Ganja crude incidence rates. Unfortunately, it is not possible to accurately evaluate trends in Lenkoran-Astara because the data are restricted to the years 1995-2000. What may be even more interesting is the fact that the same patterns are generally shared among the various cancer sites examined in this study (i.e., all cancers combined, larynx, lung, urinary bladder, female breast).

The pattern of decrease throughout the early and mid 1990s is evident in the age-standardized rates as well, particularly for males from the Azerbaijan national population where stochastic variation is minimal (Figures 5.23 – 5.31). This trend is not always easy to visualize, particularly among the less-frequently occurring cancers (e.g., cancer of the larynx) owing to instability of the rates, and among females, also because of the low numbers of cases involved. It is important to note that both crude and age-standardized rates show very similar patterns.

Though quantitative analyses can statistically demonstrate the existence of differences between regions, given the difficulties introduced by poor data quality and availability, qualitative analyses can also be useful. Studying the overall patterns of cancer incidence through graphs can provide insight not only into regional differences in cancer burden, but also into temporal changes in cancer risk that may be used to generate hypotheses to explain the observed trends.

One of the most striking features of the plots of cancer incidence in terms of geographical comparisons is that Sumgayit data do not differ from the national averages in any meaningful way until the early 1990s. Throughout the early and mid 1980s, cancer incidence in Sumgayit is either very similar to, or below the Azerbaijan average. Then, near the end of the 1980s, cancer incidence rates in Sumgayit rise dramatically, and surpass the national rates. Though the exact timing of this change of rank varies somewhat by cancer site, the overall pattern remains the same. For the remainder of the 1990s, rates in Sumgayit follow a near parallel path to the national rates, dropping substantially in the early 1990s and stabilizing near the end of the decade, though remaining consistently above them.

5.2.9. International Comparisons

Crude cancer incidence rates for several of the cancer sites being studied were obtained for several regions of interest from the World Health Organization's European Health for All Database (WHO HFA Website). Incidence rates for the two remaining Caucasus countries, Armenia and Georgia, and the Russian Federation were secured. Furthermore, several composite incidence rate averages were obtained for several regions, including the Central Asian Republics (CAR) of the former Soviet Union, the Newly Independent States (NIS) and the European Union (EU). Unfortunately, incidence rates for Azerbaijan, the CAR, and the EU were available beginning only in 1990. Data for the Russian Federation were available beginning only in 1985.

The Health for All Database provides data for several cancer sites of interest to this study: 1) all cancer sites combined (ICD-9: 140-208), 2) cancer of the trachea, bronchus, and lung (ICD-9: 162), and 3) cancer of the female breast (ICD-9: 174).

All Cancer Sites Combined (ICD-9: 140-208)

Crude cancer incidence rates for all cancer sites combined (ICD-9: 140-208) were obtained for selected regions from the WHO-HFA Database (Figure 5.32). Cancer incidence in Sumgayit is generally higher than that of Azerbaijan, though rates are unremarkable when compared to the neighbouring Caucasus countries of Armenia and Georgia, though rates in Sumgayit are generally lower. The crude incidence rates for all cancers combined obtained from the HFA Database for the nation of Azerbaijan agree almost perfectly with the rates calculated in this study.

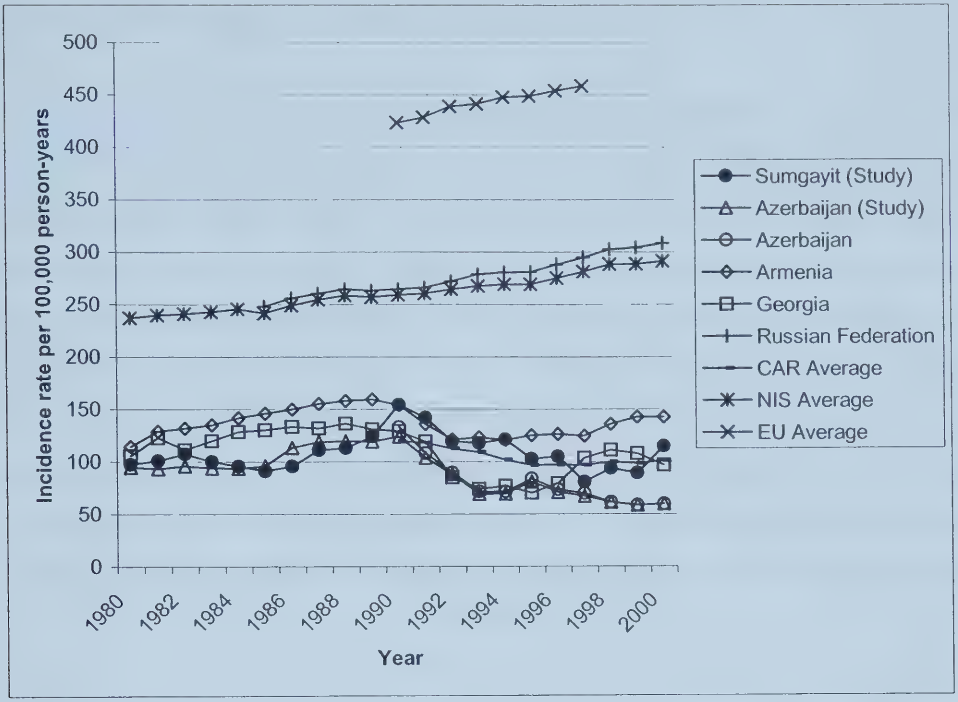

Figure 5.32. International comparisons of annual crude cancer incidence for selected regions, all cancers sites combined (ICD-9: 140-208).

Cancer incidence in both Armenia and Georgia is slightly higher than in Azerbaijan, though the overall patterns in the rates are quite similar. All three Caucasus countries demonstrate a pattern of moderate increase over the 1980s, followed by sharp decreases in the early 1990s, and a period of recovery and stabilization in the mid to late 1990s. A similar pattern is evident for the Central Asian Republics. Incidence in both the Russian Federation and the NIS is quite different from that of the Caucasus region. Both of these regions show a pattern of consistent increase over the duration of the study period. Furthermore, incidence rates in both the Russian Federation and the NIS are approximately double those of the Caucasus nations and Central Asian Republics. Cancer incidence in the European Union is approximately four times higher than that of the Caucasus nations.

Crude lung cancer incidence exhibits a similar pattern to that of all cancer sites combined (Figure 5.33). Lung cancer incidence rates for Azerbaijan calculated in the study are nearly identical to those obtained from the HFA database. Cancer incidence rates in Azerbaijan are the lowest of all comparison regions. Though cancer incidence in Sumgayit is generally higher than Azerbaijan, it shows considerable variability, and is generally lower than the rates in Armenia or Georgia. Average incidence in the NIS is double that of the Caucasus region, with rates in the Russian Federation being significantly higher. The highest incidence occurs in the European Union. All regions formerly part of the Soviet Union, aside from the Russian Federation, show a similar pattern of increasing rates throughout the 1980s, followed by decreases in the 1990s.

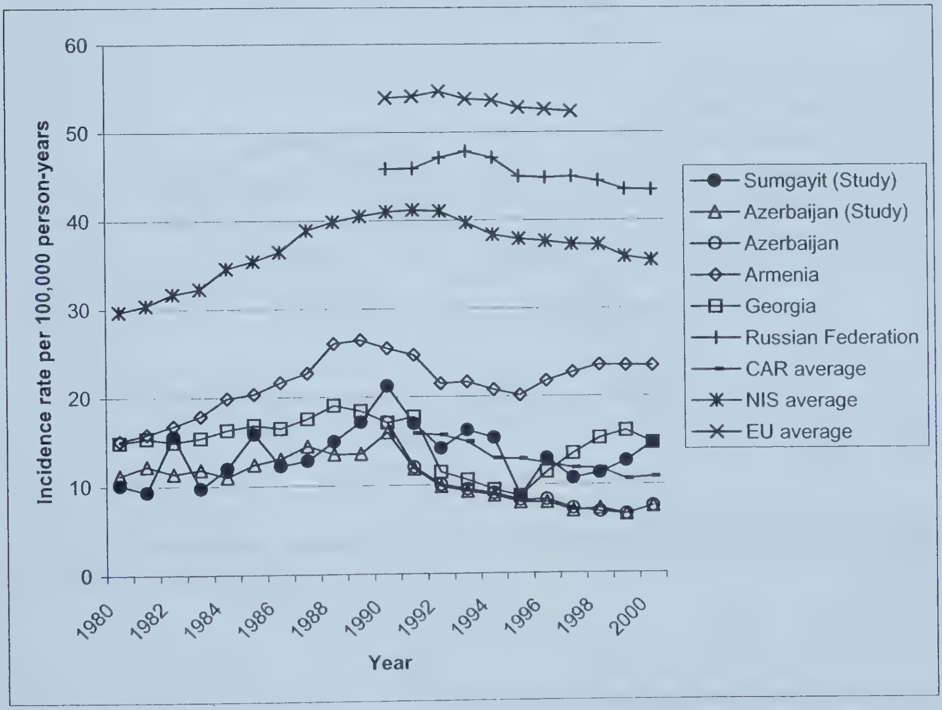

Figure 5.33. International comparisons of annual crude cancer incidence for selected regions, cancer of the trachea, bronchus, and lung (ICD-9: 162).

Female breast cancer incidence has been graphed for selected comparison regions (Figure 5.34). Cancer incidence in Sumgayit and Azerbaijan is considerably lower than in any of the other comparison regions. In contrast to all cancers combined and lung cancer, female breast cancer incidence is higher in Georgia than in Armenia. Once again, a pattern of moderate increase throughout the 1980s is evident in the Caucasus region, followed by decreases in the early 1990s, and stabilization or increase in the mid- to late-1990s. Breast cancer in the Russian Federation shows a consistent trend of strong increase for the duration of the period 1985-2000.

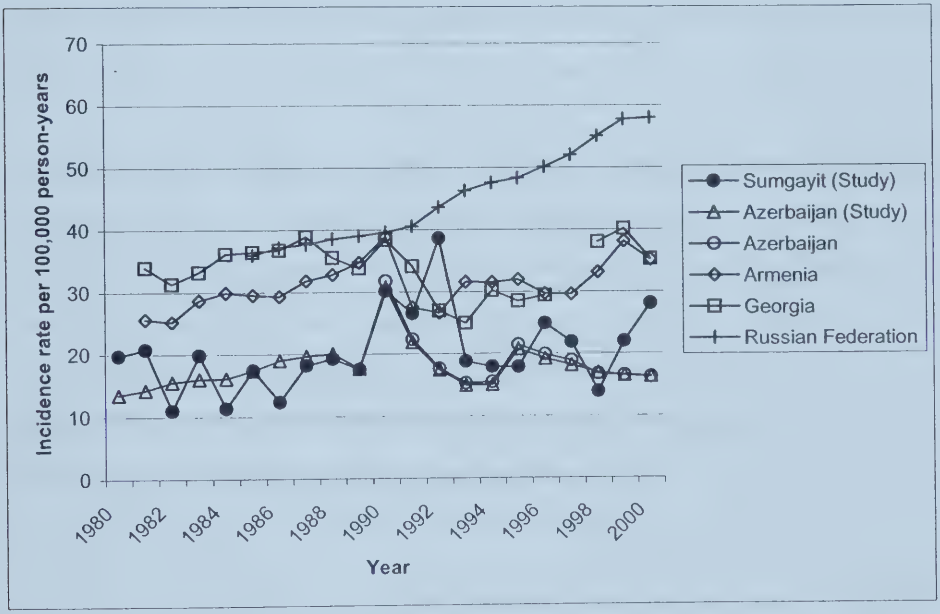

Figure 5.34. International comparisons of annual crude cancer incidence for selected regions, cancer of the female breast (ICD-9: 174).

Canadian Comparison

Attempts were made to secure Canadian data from the Canadian Cancer Society (CCS) Website. Unfortunately, most incidence and mortality data provided by the CCS are standardized to the 1991 Canadian population, making international comparisons difficult. Canadian cancer incidence data standardized to the world standard population were obtained from the Cancer in Five Continents publication instead (Parkin *et al.* 1997). The data from this source, however, are single estimates representing the average of annual rates over the period 1988-1992. However, given the stability generally shown in Canadian cancer rates, this is not expected to pose a major problem over the short time period being averaged. Azerbaijan, in contrast, shows major fluctuations in cancer rates over relatively short periods of time, and thus, taking averages of the rates over the study period results in the loss of a great deal of the descriptiveness in the data.

It is clear that cancer incidence in Azerbaijan is considerably lower than that in Canada for most cancer sites, with the exception of laryngeal cancer (Table 5.29). Incidence rates for most cancer sites tend to be one-third to one-quarter that of the rates in Canada, though laryngeal cancer incidence would appear to be equal. It must be noted that rates for Azerbaijan demonstrated considerable decreases in the early 1990s, which are not reflected in the averages displayed below. However, averages are used in order to facilitate a crude comparison with Canadian data.

Table 5.19. Comparison of age-standardized incidence rates (ASIRs) between Azerbaijan and Canada.

Cancer Site	Age-Standardized Incidence Rates (ASIRs)		
	Sumgayit (1992-2000)	Azerbaijan (1991-2000)	Canada (1988-1992)
Males			
Larynx (ICD-9: 161)	5.8	6.3	6.3
Lung (ICD-9: 162)	30.3	20.2	65.4
Urinary Bladder (ICD-9: 188)	10.4	4.6	18.7
All Sites Combined (ICD-9: 140-208)	159.8	112.5	322.1
Females			
Larynx (ICD-9: 161)	1.2	1.0	1.2
Lung (ICD-9: 162)	7.2	3.8	28.0
Urinary Bladder (ICD-9: 188)	1.7	0.9	5.0
Female Breast (ICD-9: 174)	26.3	21.2	76.8
All Sites Combined (ICD-9: 140-208)	110.7	80.4	252.8

5.2. Cancer Mortality

Cancer mortality data have been qualitatively analyzed through plots of crude mortality rates, semi-quantitatively through a Proportional Mortality Ratio (PMR) analysis, and quantitatively through Poisson regression analyses of the crude data over the study period 1980-2000.

5.3.1. Crude Mortality Rates

Crude cancer mortality rates have been calculated for the period 1980-2000. Crude cancer rates demonstrate considerable instability, so moving three-year period time weighted averages (TWAs) were used to smooth rates. All cancer mortality data, including reported numbers of deaths, and actual incidence rates can be viewed in *Appendix III: Cancer Incidence and Mortality Rates, Tables AIII.32-AIII.36.*

All Cancer Sites Combined (ICD-9: 140-208)

Cancer mortality rates for all cancer sites combined show a great deal of variability over time (Figure 5.35). Smoothing rates using a time-weighted averages approach makes the rates much easier to examine (Figure 5.36). Similar to the pattern shown for cancer incidence, cancer mortality rates for Sumgayit are below national averages until the end of the 1980s, at which point they show a considerable increase, and surpass national rates. Over the entire next decade, cancer rates in Sumgayit are higher than in any of the other regions. A point to note is the slight drop in Sumgayit cancer mortality rates near the end of the 1980s, only to be followed by the major increase in mortality leading into the 1990s. What is particularly interesting is that over the study period, mortality rates in Sumgayit are almost a perfect mirror image of those of Azerbaijan. While this could be caused simply by chance, it is also possible that some factor affected cancer mortality in Sumgayit and Azerbaijan as a whole differently, or at least the reporting of cancer mortality. Ganja exhibits a pattern very similar to Sumgayit. Cancer mortality in Lenkoran-Astara is considerably lower than in any of the other regions, but since there are only four data points available, it is difficult to draw any conclusions.

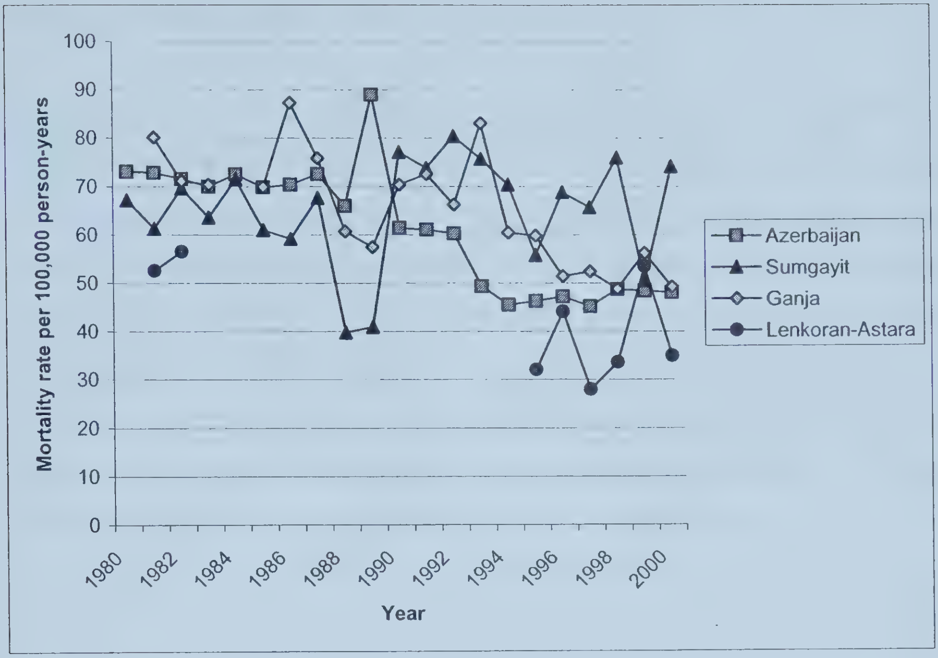

Figure 5.35. Annual crude cancer mortality rates for selected regions of Azerbaijan, males and females, all cancer sites combined (ICD-9: 140-208).

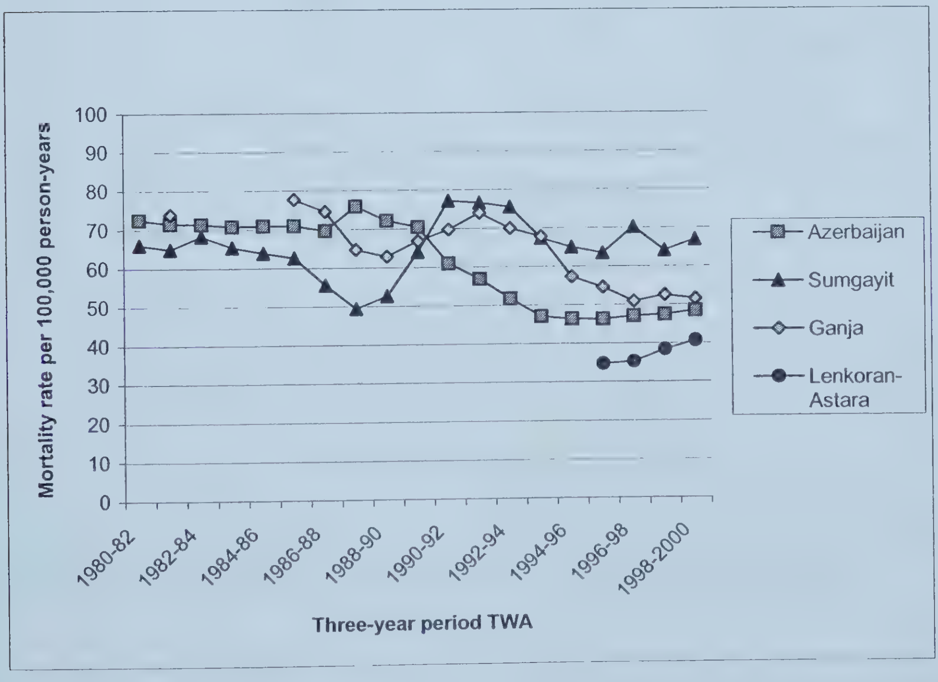

Figure 5.36. Three-year moving time-weighted averages of crude cancer mortality rates for selected regions of Azerbaijan, males and females, all cancer sites combined (ICD-9: 140-208).

Laryngeal cancer mortality rates for the nation of Azerbaijan are low, typically around two deaths per 100,000 population annually. National laryngeal cancer mortality rates show a monotonic pattern of decrease for the duration of the study period (Figure 5.37). Despite some instability, Ganja also exhibits a similar pattern. In contrast, cancer mortality rates in Sumgayit show fluctuation without any overall trend of increase or decrease from 1980-1995, followed by a considerable peak near the end of the 1990s. For the majority of the study period, mortality rates in Sumgayit are below those of both Ganja and Azerbaijan. Only for the last four data points are rates higher in Sumgayit. Laryngeal cancer mortality in Lenkoran-Astara is unremarkable.

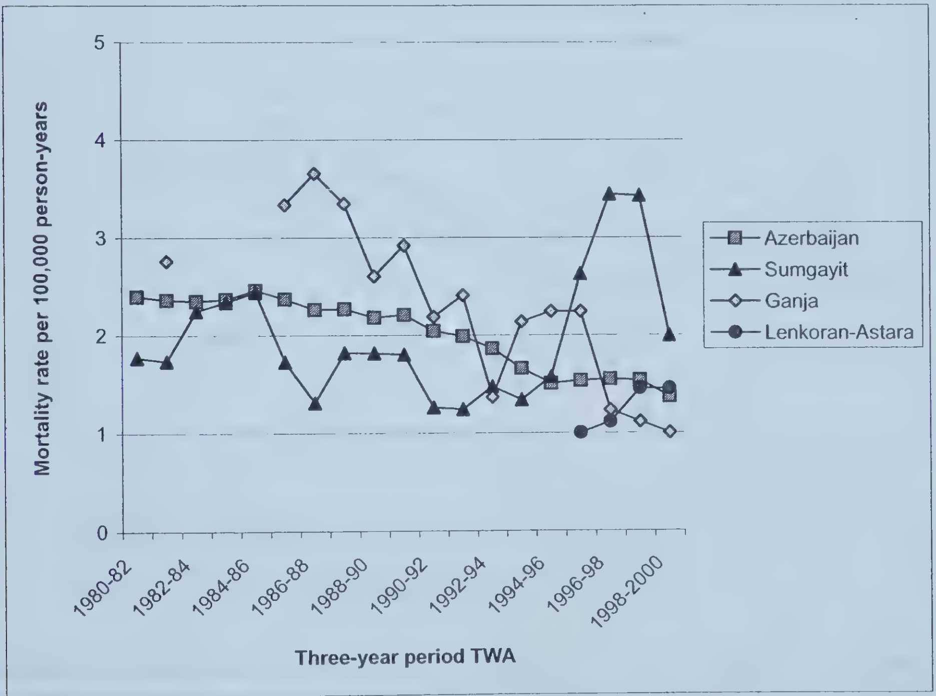

Figure 5.37. Three-year period moving time-weighted averages of crude cancer mortality for selected regions of Azerbaijan, males and females, laryngeal cancer (ICD-9: 161).

Mortality rates in Azerbaijan for cancer of the trachea, bronchus, and lung also follow a pattern of stability in the 1980s and decrease in the 1990s (Figure 5.38). Ganja generally exhibits the highest cancer mortality over the study period. Though Sumgayit shows considerable fluctuation, it can generally not be distinguished as being different from the national data, except perhaps for the last four data points, where a dramatic increase is noted. Once again, mortality rates in Lenkoran-Astara are visibly lower than all other regions. Lung cancer mortality for all regions generally ranges from four to 12 cases per 100,000 population annually.

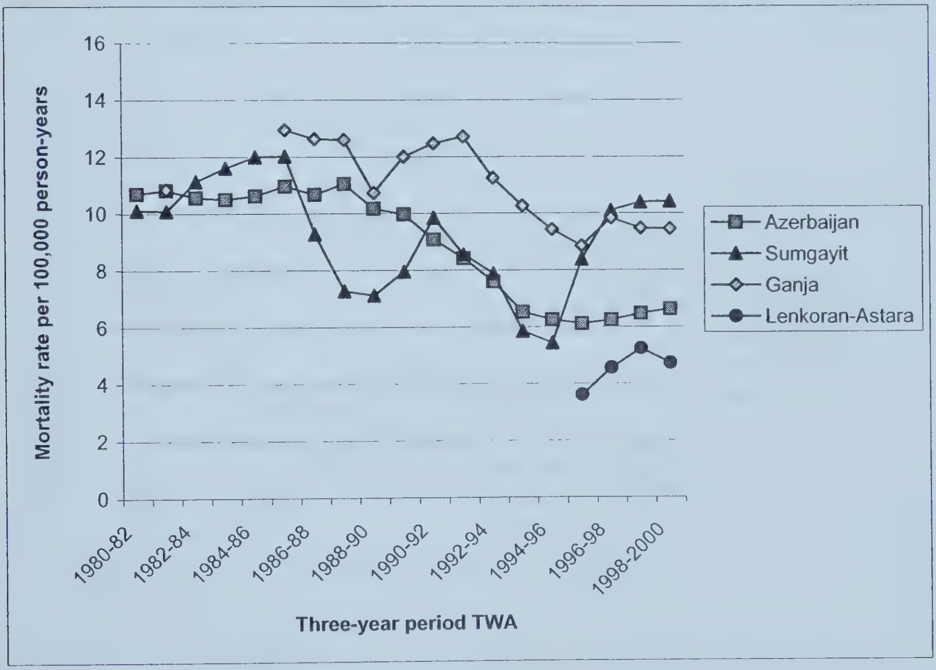

Figure 5.38. Three-year period moving time-weighted averages of crude cancer mortality for selected regions of Azerbaijan, males and females, lung cancer (ICD-9: 162).

Urinary bladder cancer mortality demonstrates a slightly different temporal pattern than the other cancer sites (Figure 5.39). Though national rates demonstrate a typical monotonic decrease over the study period, the pattern for Sumgayit can be divided into two distinct segments. From 1980 to 1989, a steep decrease is evident; however, from 1990 to 1997, rates increase sharply. A slight drop-off is evident for the final three years, 1998-2000. For the majority of the study period, bladder cancer mortality is highest in the Sumgayit region. Cancer mortality in Ganja appears to be stable over the 1980s, but peaks sharply around 1990, decreases in the early 1990s, and finally increases once again in the mid to late 1990s. Cancer mortality in Lenkoran-Astara is very similar to both Ganja and the national averages.

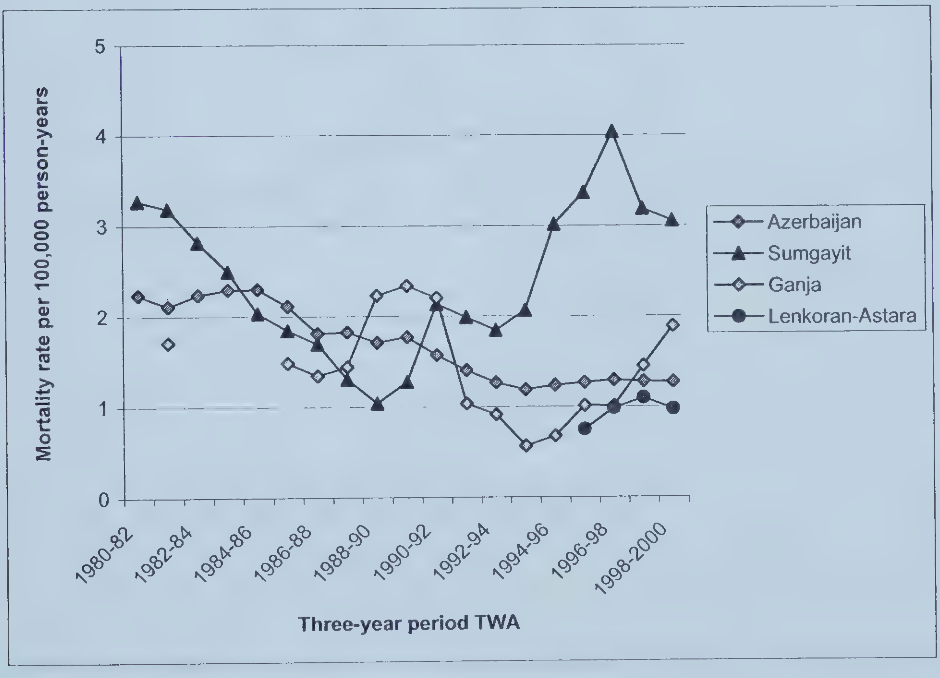

Figure 5.39. Three-year period moving time-weighted averages of crude cancer mortality for selected regions of Azerbaijan, males and females, urinary bladder cancer (ICD-9: 188).

Cancer of the Male and Female Breast (ICD-9: 174, 175)

Breast cancer mortality (males and females combined) is greatest in the Ganja region of Azerbaijan (Figure 5.40). Temporal patterns of breast cancer mortality in Sumgayit and Azerbaijan are very similar to each other, exhibiting increases throughout the 1980s, a sharp decrease in the early 1990s, and a degree of stabilization in the late 1990s. This pattern for the Azerbaijan rates is somewhat different than what has been seen with other cancers, particularly the steady increase seen throughout the 1980s. In contrast to Sumgayit and Azerbaijan, Ganja generally exhibits a trend toward decreasing rates. Aside from the elevated rates seen in Ganja, regions cannot be easily separated by their cancer mortality rates.

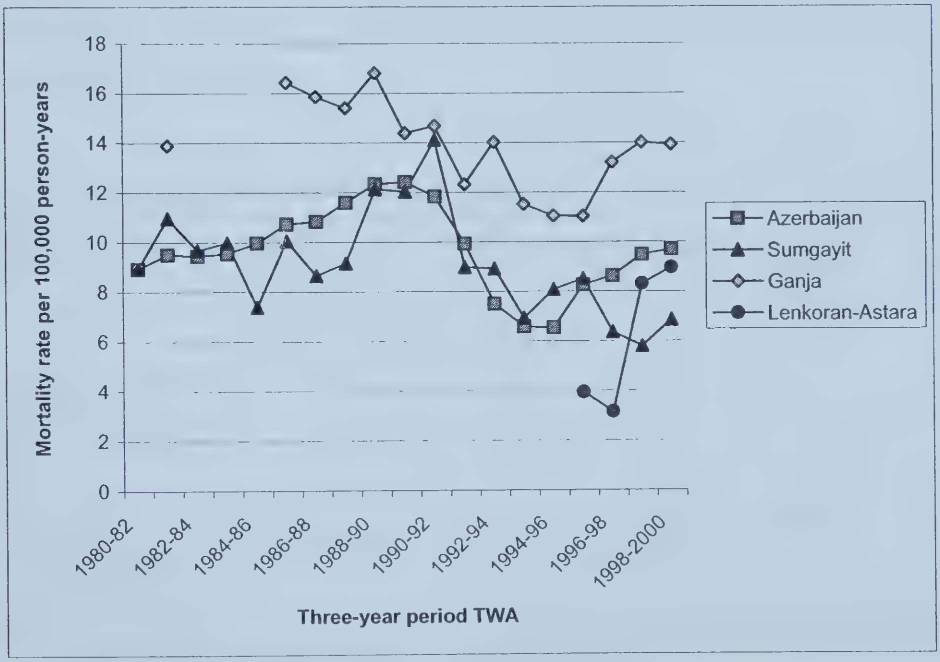

Figure 5.40. Three-year moving time-weighted averages of crude cancer mortality for selected regions of Azerbaijan, males and females, breast cancer (ICD-9: 174, 175).

Childhood Cancer Mortality

Childhood cancer mortality data were collected for the period 1980-2000, but were not sufficiently complete to justify analysis.

5.3.2. Proportional Mortality Ratio (PMR) Analysis

Proportional Mortality Ratio (PMR) analyses of cancer mortality data in Azerbaijan are summarized in Table 5.20. Sumgayit suffers a higher burden of cancer mortality from urinary bladder and trachea, bronchus & lung cancers, and lower proportionate mortality from female breast cancer than does the nation of Azerbaijan. Ganja shows a higher proportion of mortality from trachea, bronchus, and lung cancer, and a lower proportion of mortality due to urinary bladder cancer than the reference area. As with the PMR analysis of incidence data, Lenkoran-Astara has a considerably lower proportionate mortality attributable to the four selected cancer sites (though the results are not statistically significant), with the difference apparently being accounted by the 'all other cancers' category. Relative to national data, the other regions category shows higher proportions of mortality due to trachea, bronchus, & lung cancer, and a lower proportion due to female breast cancer.

Table 5.20. Proportional Mortality Ratio (PMR) analysis of cancer mortality data for selected regions of Azerbaijan and selected cancer sites, 1980-2000.

Cancer Site	*Azerbaijan (reference)*	Sumgayit	Ganja	Lenkoran-Astara	Other regions
Larynx (ICD-9: 161)	*1.00*	0.89 (0.74, 1.07)	1.06 (0.89, 1.26)	0.86 (0.58, 1.27)	0.99 (0.96, 1.03)
Trachea, bronchus, lung (ICD-9: 162)	*1.00*	1.20 (1.11, 1.30)	1.40 (1.30, 1.51)	0.86 (0.70, 1.05)	1.21 (1.19, 1.23)
Urinary bladder (ICD-9: 188)	*1.00*	1.38 (1.17, 1.64)	0.86 (0.70, 1.07)	0.79 (0.50, 1.25)	1.02 (0.98, 1.06)
Female breast (ICD-9: 174)	*1.00*	0.69 (0.61, 0.78)	1.07 (0.97, 1.18)	0.75 (0.60, 0.95)	0.77 (0.76, 0.79)
All other cancers (ICD-9: 140-160; 163-173; 175-187; 189-208)	*1.00*	1.00 (0.98, 1.02)	0.93 (0.90, 0.95)	1.07 (1.03, 1.11)	1.00 (0.99, 1.00)

Note: Cancer incidence data are missing for several years and regions, and are therefore not included in this analysis: Ganja 1980, 1984; Lenkoran-Astara 1980, 1983-1994.

5.3.3. Poisson Regression Analysis – Crude Mortality Data (1980-2000)

The results of the univariate analyses of crude cancer mortality data from selected regions of Azerbaijan are summarized in Table 5.21. The univariate models used are as follows:

Area: $\lambda = \alpha + \beta_1$Area   Year: $\lambda = \alpha + \beta_1$Year

Sex: $\lambda = \alpha + \beta_1$Sex   Age: $\lambda = \alpha + \beta_1$Age

Sumgayit shows elevated mortality rates for urinary bladder cancer, and moderately elevated rates for all cancers combined relative to the reference area. Results for laryngeal, trachea, bronchus & lung, and breast cancer are not statistically significant. Ganja demonstrates high mortality from breast cancer, and moderately elevated rates for trachea, bronchus & lung, and all cancers combined. Lenkoran-Astara demonstrates deficits in mortality for each of the cancer sites examined.

Table 5.21. Poisson regression results from a univariate analysis of crude mortality data for selected regions of Azerbaijan, 1980-2000.

Cancer Site	Region	Rate Ratio		
		RR	95 % C.I.	
			Lower	Upper
All sites ICD-9: 140-208	*Other regions*	**1.00**	-	-
	Sumgayit	**1.08**	1.04	1.12
	Ganja	**1.07**	1.04	1.11
	Lenkoran-Astara	**0.68**	0.64	0.73
Larynx ICD-9: 161	*Other regions*	**1.00**	-	-
	Sumgayit	**0.97**	0.80	1.18
	Ganja	**1.15**	0.96	1.38
	Lenkoran-Astara	**0.59**	0.39	0.88
Trachea, bronchus, & lung ICD-9: 162	*Other regions*	**1.00**	-	-
	Sumgayit	**1.07**	0.98	1.17
	Ganja	**1.24**	1.14	1.35
	Lenkoran-Astara	**0.48**	0.39	0.60
Urinary bladder ICD-9: 188	*Other regions*	**1.00**	-	-
	Sumgayit	**1.46**	1.23	1.74
	Ganja	**0.91**	0.73	1.13
	Lenkoran-Astara	**0.53**	0.33	0.84
Female breast ICD-9: 174	*Other regions*	**1.00**	-	-
	Sumgayit	**0.96**	0.85	1.09
	Ganja	**1.48**	1.34	1.64
	Lenkoran-Astara	**0.66**	0.52	0.84

5.4. Lifestyle Survey

Results are presented for two independently conducted surveys, one administered by students in the city of Sumgayit, and the other administered by staff from the State Committee on Statistics. Both data quality and the results obtained from the surveys will be discussed.

5.4.1. Data Quality

Owing to problems with questionnaire administration, recording of responses, and data entry, the limitations of the survey must first be discussed before the results can be presented. Because two surveys were conducted by separate groups of interviewers using different versions of the questionnaire, issues of data quality from each of the surveys must be examined individually.

Student-Conducted Survey

In general, the data obtained from the student survey were of somewhat questionable quality, as for many individuals key data were missing and the exclusion criteria were often not followed. For example, in the student-administered questionnaires several individuals under the age of 18, and many individuals who had not resided in Sumgayit for 18 years or more were interviewed. Consequently, the data collected from a large number of individuals (N=97) had to be excluded from the analysis, reducing the sample size substantially (from N=294 to N=197).

Fortunately, data for several variables were collected accurately, including: age, sex, residence time, smoking prevalence, number of cigarettes per day, years smoked, previous smoking, drinking prevalence, dietary consumption prevalence, and family history of cancer. However, several variables had to be excluded from the analysis entirely, owing to incorrect data recording and/or missing data, including: (for past smokers: age started smoking, previous number of years smoked, and age quit), alcohol

consumption start age, average weekly alcohol consumption, and average weekly dietary consumption. Though imperfect, the data collected in the student survey is of sufficient quality to provide a reasonable comparison to the estimates obtained by the State Committee on Statistics, although the comparison cannot be as robust as initially envisioned.

State Committee on Statistics-Conducted Survey

The data collected by the State Committee on Statistics (SCS) were generally of higher quality than those obtained by the student survey. The analysis of data from the SCS could therefore be expanded to include the variables: alcohol consumption start age, average weekly alcohol consumption, and average weekly dietary consumption. However, data collected for the variables describing previous smoking habits (age started smoking, previous number of years smoked, and age quit) were not of sufficient quality for analysis. As in the student survey, data from many individuals had to be excluded because they did not meet the two inclusion criteria: age (18 years or older), and, most often, residency (resident of the city for 18 years or more). This problem was most evident in Sumgayit, where 84 participants had to be excluded for not meeting the inclusion criteria. Fewer participants had to be excluded in the other study regions (18 from Ganja, and 33 from Lenkoran-Astara).

5.4.2. Survey Results

Demographic data collected from the lifestyle surveys are summarized in Table 5.22. A greater proportion of males than females was interviewed in each of the regions; and although some variation is evident in the regional sex ratios of participants, this degree of variation does not appear serious enough to warrant concern. The age of survey participants does not show great variation between regions, though the average age of participants in the student and SCS surveys in Sumgayit differed significantly. Sumgayit citizens had the lowest mean residence time, while persons in Ganja and Lenkoran-Astara had lived in their region approximately ten years longer on average.

Estimates of male smoking prevalence in Sumgayit did not differ significantly between student and SCS surveys, though Ganja and Lenkoran-Astara both showed elevated smoking prevalences relative to Sumgayit (Table 5.23). Similarly, the mean number of years smoked by men in Sumgayit was not significantly different between student and SCS surveys, while estimates for Ganja and Lenkoran-Astara are considerably higher. The mean number of cigarettes smoked per day was highest for men in the student survey from Sumgayit, while the lowest mean number was obtained from the SCS survey in Sumgayit. When making comparisons within the SCS survey results, the number of cigarettes smoked per day is lower in Sumgayit than either of Ganja or Lenkoran-Astara, which have similar estimates. Ex-smoking prevalence tends to be low among the study regions, with the exception of Lenkoran-Astara in which over one-quarter of non-smokers had smoked previously. It is interesting to note that the SCS survey in Sumgayit did not record any ex-smokers. In summary, male smoking prevalence in all of the regions is quite high, though rates in Sumgayit are lower than the comparison regions.

In sharp contrast to the pattern for males, the prevalence of female smoking demonstrated the opposite pattern, with the lowest estimate obtained from the student survey in Sumgayit, and the highest estimate from the SCS survey in Sumgayit. No difference was evident between Ganja and Lenkoran. Owing to the small number of female smokers, no statistical analysis could be attempted for the variables: number of years smoked, and number of cigarettes per day, except for the SCS survey in Sumgayit. No female ex-smokers were recorded in any of the study areas. In all regions, female smoking occurs at a much lower frequency than for males.

Results for male drinking habits are summarized in Table 5.24. Similar patterns are evident among regions of Azerbaijan in terms of drinking prevalence. Vodka is the most popular alcoholic beverage in all regions, followed by beer, with wine, brandy, and other beverages being much less preferred. Approximately half of the male population in all regions frequently drink vodka, and one-third to one-half of the men drink beer regularly. Drinking prevalences in Sumgayit obtained from student and SCS surveys are very

similar. Men in the selected study regions generally begin drinking in their mid-20s. Average age at first consumption tends to be slightly higher in Sumgayit, though the result is not significantly different than in the other regions. Average weekly consumption among men generally does not differ significantly between Sumgayit and Ganja, though consumption of vodka and beer in Lenkoran-Astara is much higher.

Female drinking habits have also been summarized (Table 5.25). Female alcohol consumption occurs infrequently relative to men in all study regions, with prevalence typically less than ten percent for each type of alcoholic beverage. Similar to the results seen for smoking prevalence, SCS estimates of female drinking prevalence are much higher than those obtained for the student survey, and are the highest of all study regions. Unfortunately, owing to the small number of female drinkers, and poorly recorded data, the variables "age started drinking" and "average weekly consumption" cannot be meaningfully analyzed.

Analyses of population-level dietary habits are summarized in Table 5.26. Consumption prevalence results from the student and SCS surveys in Sumgayit differ considerably. Though actual consumption prevalence figures may vary between region, mutton, beef and chicken are widely consumed in all regions (with the exception of mutton in Lenkoran-Astara, which is considerably lower). Fish is also consumed quite broadly, though not nearly as much as the abovementioned three meats. Weekly consumption for each of the various meat products tends to be slightly greater than once per week, aside from Lenkoran-Astara where beef, fish, and chicken are all consumed more than twice a week. Pork is rarely consumed in any of the regions. Herbs and vegetables, as well as fruits are consumed with relatively uniform high prevalence in all study regions.

Data describing family history of cancer are summarized in Table 5.27. Though the prevalence of family history of cancer differs between the student and SCS surveys, no statistically significant differences are present in SCS survey results across any of the regions. That being said, Ganja demonstrates the highest rate of family history of cancer, and Lenkoran-Astara the lowest.

Table 5.22. Lifestyle survey results from student- and State Committee on Statistics-administered questionnaires, demography.

Parameter	Sumgayit (Students)			Sumgayit (SCS)			Ganja (SCS)			Lenkoran-Astara (SCS)		
Sex	N		%	N		%	N		%	N		%
Males	115		58.4	189		71.1	217		65.4	174		54.9
Females	82		41.6	77		28.9	115		34.6	143		45.1
Total	197		100	266		100	332		100	317		100
Age/Residence	**Mean**	**SD**	**95% CI**	**Mean**	**SD**	**95% CI**	**Mean**	**SD**	**95% CI**	**Mean**	**SD**	**95% CI**
Age (years)	38.9	14.9	(36.8, 41.0)	48.6	11.6	(47.1, 50.0)	45.9	15.8	(44.2, 47.6)	43.5	12.9	(42.1, 44.9)
Residence Time (years)	30.0	9.3	(29.3, 30.7)	29.0	14.4	(27.3, 30.7)	38.9	14.0	(37.4, 40.4)	41.6	12.8	(40.1, 43.0)

Table 5.23. Lifestyle survey results from student and State Committee on Statistics -administered questionnaires, smoking habits.

	Sumgayit (Students)			Sumgayit (SCS)			Ganja (SCS)			Lenkoran-Astara (SCS)		
Males	N	%.	95% CI	N	%.	95% CI	N	%.	95% CI	N	%	95% CI
Current smokers	58	50.4	(41.3, 59.5)	75	39.7	(32.7, 46.7)	108	49.8	(43.1, 56.5)	118	67.8	(60.9, 74.7)
Ex-smokers	13	11.3	(5.5, 17.1)	0	0.0	-	8	3.7	(1.2, 6.2)	12	6.9	(3.1, 10.7)
Non smokers	44	38.3	(29.4, 47.2)	114	60.3	(53.3, 67.3)	101	46.5	(39.9, 53.1)	44	25.3	(18.8, 31.8)
Total	115	100.0		189	100.0		217	100.0		174	100.0	
Females												
Current smokers	1	1.2	(0.0, 3.6)	10	13.0	(5.5, 20.5)	1	0.9	(0.0, 2.6)	2	1.4	(0.0, 3.3)
Ex-smokers	0	0.0	-	0	0.0	-	0	0.0	-	0	0.0	-
Non smokers	81	98.8	(96.4, 100.0)	67	87.0	(79.5, 94.5)	114	99.1	(97.4, 100.0)	141	98.6	(96.7, 100.0)
Total	82	100.0		77	100.0		115	100.0		143	100.0	
Males	**Mean**	**SD**	**95% CI**	**Mean**	**SD**	**95% CI**	**Mean**	**SD**	**95% CI**	**Mean**	**SD**	**95% CI**
Years smoked	15.6	13.2	(12.2, 19.0)	14.0	10.4	(11.6, 16.4)	24.4	13.6	(21.8, 27.0)	19.2	10.6	(17.2, 21.1)
Cigarettes / day	20.6	12.1	(17.5, 23.7)	10.8	4.8	(9.7, 11.9)	15.8	5.3	(14.8, 16.8)	14.6	5.2	(13.7, 15.6)
Females												
Years smoked	24.0	-	-	9.8	6.2	(5.8, 13.8)	50	-	-	20	-	-
Cigarettes / day	7.0	-	-	10.2	5.9	(8.9, 11.5)	10	4.6	-	18	-	-

Table 5.24. Lifestyle survey results from student- and State Committee on Statistics -administered questionnaires, male drinking habits.

Parameter	Sumgayit (Students)			Sumgayit (SCS)			Ganja (SCS)			Lenkoran-Astara (SCS)		
Overall Prevalence	N	%.	95% CI	N	%.	95% CI	N	%.	95% CI	N	%.	95% CI
Drinkers	70	60.9	(52.0, 69.8)	126	66.7	(60.0, 73.4)	166	76.5	(70.9, 82.1)	100	57.5	(50.2, 64.8)
Non-drinkers	45	39.1	(30.2, 48.0)	63	33.3	(26.6, 40.0)	51	23.5	(17.9, 29.1)	74	42.5	(35.2, 49.8)
Total	115	100.0		189	100.0		217	100.0		174	100.0	
Prevalence by beverage												
Beer	39	33.9	(25.2, 42.6)	82	43.4	(36.3, 50.5)	111	51.2	(44.5, 57.9)	47	27.0	(20.4, 33.6)
Wine	14	12.2	(6.2, 18.2)	12	6.3	(2.8, 9.8)	78	35.9	(29.5, 42.3)	2	1.1	(0.0, 2.6)
Brandy	19	16.5	(9.7, 23.3)	12	6.3	(2.8, 9.8)	33	15.2	(10.4, 20.0)	2	1.1	(0.0, 2.6)
Vodka	55	48.2	(39.1, 57.3)	85	45.0	(37.9, 52.1)	145	66.8	(60.5, 73.1)	90	51.7	(44.3, 59.1)
Other	5	4.3	(0.6, 8.0)	0	0.0	-	1	0.5	(0.0, 1.4)	7	4.0	(1.1, 6.9)
Mean Start Age (Years)	Mean	SD	95% CI	Mean	SD	95% CI	Mean	SD	95% CI	Mean	SD	95% CI
Beer	-	-	-	29.3	10.8	(27.0, 31.6)	24.9	10.0	(23.0, 26.8)	20.8	3.6	(19.8, 21.8)
Wine	-	-	-	24.6	3.8	(22.0, 27.2)	26.2	10.5	(23.9, 28.5)	22.8	3.7	(17.7, 27.9)
Brandy	-	-	-	28.4	7.6	(23.1, 33.7)	25.7	9.2	(22.6, 28.8)	23.1	3.3	(18.5, 27.8)
Vodka	-	-	-	24.9	5.8	(23.6, 26.2)	25.2	10.3	(23.5, 26.9)	20.9	3.4	(20.2, 21.6)
Other	-	-	-	-	-	-	-	-	-	19.8	2.4	(18.0, 21.6)
Mean Weekly Consumption (mL)												
Beer	-	-	-	224	108	(201, 248)	159	211	(120, 198)	1089	504	(945, 1233)
Wine	-	-	-	240	193	(131, 350)	123	106	(100, 147)	250	71	(152, 348)
Brandy	-	-	-	150	56	(118, 182)	100	0	-	200	0	-
Vodka	-	-	-	193	101	(171, 215)	126	117	(107, 145)	363	215	(319, 408)
Other	-	-	-	-	-	-	50	-	-	150	29	(129, 171)

Table 5.25. Lifestyle survey results from student- and State Committee on Statistics -administered questionnaires, female drinking habits.

Parameter	Sumgayit (Students)			Sumgayit (SCS)			Ganja (SCS)			Lenkoran-Astara (SCS)		
Drinking Habits (%)	N	Est.	95% CI	N	Est.	95% CI	N	Est.	95% CI	N	Est.	95% CI
Drinkers	6	7.3	(1.7, 12.9)	15	5.4	(0.4, 10.4)	8	7.0	(2.3, 11.7)	1	0.7	(0.0, 2.1)
Non-drinkers	76	92.7	(87.1, 98.3)	62	94.6	(89.6, 99.6)	107	93.0	(88.3, 97.7)	142	99.3	(97.9, 100.0)
Total	82	100.0		77	100.0		115	100.0		143	100.0	
Drinking Prevalence												
Beer	2	2.4	(0.0, 5.7)	9	11.7	(4.5, 18.9)	4	3.5	(0.1, 6.9)	0	0.0	-
Wine	1	1.2	(0.0, 3.6)	1	1.3	(0.0, 3.8)	2	1.7	(0.0, 4.1)	0	0.0	-
Brandy	1	1.2	(0.0, 3.6)	4	5.2	(0.2, 10.2)	4	3.5	(0.1, 6.9)	0	0.0	-
Vodka	2	2.4	(0.0, 5.7)	10	13.0	(5.5, 20.5)	3	2.6	(0.0, 5.5)	1	0.7	(0.0, 2.1)
Other	3	3.7	(0.0, 7.8)	0	0.0	-	0	0.0	-	0	0.0	-
Mean Start Age (Years)	Mean	SD	95% CI	Mean	SD	95% CI	Mean	SD	95% CI	Mean	SD	95% CI
Beer	-	-	-	26.9	4.1	(24.2, 29.6)	21.0	13.5	(7.8, 34.2)	0.0	-	-
Wine	-	-	-	35.0	-	-	40.0	14.1	(20.5, 59.5)	0.0	-	-
Brandy	-	-	-	25.3	8.4	(15.8, 34.8)	22.8	11.7	(11.3, 34.3)	0.0	-	-
Vodka	-	-	-	24.3	4.3	(21.5, 27.1)	24.7	22.3	(0.0, 49.9)	20.0	-	-
Other	-	-	-	-	-	-	-	-	-	0.0	-	-
Mean Weekly Consumption Among Drinkers (mL)												
Beer	-	-	-	156	53	(121, 190)	100	0.0	-	0.0	-	-
Wine	-	-	-	200	-	-	100	0.0	-	0.0	-	-
Brandy	-	-	-	150	41	(110, 190)	100	0.0	-	0.0	-	-
Vodka	-	-	-	155	126	(77, 233)	83	28.9	(50, 116)	800	-	-
Other	-	-	-	-	-	-	-	-	-	0.0	-	-

Table 5.26. Lifestyle survey results from student- and State Committee on Statistics -administered questionnaires, dietary habits.

Parameter	Sumgayit (Students)			Sumgayit (SCS)			Ganja (SCS)			Lenkoran-Astara (SCS)		
Consumption Prevalence (%)	N	%	95% CI	N	%	95% CI	N	%	95% CI	N	%	95% CI
Number of Respondents	197	-	-	266	-	-	332	-	-	317	-	-
Mutton	119	60.4	(51.6, 69.2)	159	60.0	(54.1, 65.9)	244	73.5	(68.8, 78.2)	28	8.8	(5.7, 11.9)
Beef	181	91.9	(88.1, 95.7)	151	56.8	(50.8, 62.8)	308	92.8	(90.0, 95.6)	259	81.7	(77.4, 86.0)
Fish	155	78.7	(73.0, 84.4)	78	29.3	(23.8, 34.8)	175	52.7	(47.3, 58.1)	179	56.5	(51.0, 62.0)
Chicken	165	83.8	(78.7, 88.9)	133	50.0	(44.0, 56.0)	255	76.8	(72.3, 81.3)	261	82.3	(78.1, 86.5)
Pork	16	8.1	(4.3, 11.9)	3	1.1	(0.0, 2.4)	18	5.4	(3.0, 7.8)	0	0.0	-
Herbs and Vegetables	194	98.5	(96.8, 100.0)	231	86.8	(82.7, 90.9)	328	98.8	(97.6, 100.0)	305	96.2	(94.1, 98.3)
Fruit	177	89.8	(85.6, 94.0)	261	98.1	(96.5, 99.7)	329	99.1	(98.1, 100.0)	266	83.9	(79.9, 87.9)
Weekly Consumption (times/week)	**Mean**	**SD**	**95% CI**	**Mean**	**SD**	**95% CI**	**Mean**	**SD**	**95% CI**	**Mean**	**SD**	**95% CI**
Mutton	-	-	-	1.2	0.4	(1.1, 1.2)	1.1	0.3	(1.1, 1.1)	1.2	0.5	(1.0, 1.4)
Beef	-	-	-	1.6	0.6	(1.5, 1.6)	1.2	0.4	(1.2, 1.2)	2.2	1.2	(2.1, 2.3)
Fish	-	-	-	1.1	0.4	(1.0, 1.2)	1.0	0.3	(1.0, 1.0)	2.4	1.5	(2.2, 2.6)
Chicken	-	-	-	1.1	0.3	(1.0, 1.1)	1.0	0.2	(1.0, 1.0)	2.6	1.6	(2.4, 2.8)
Pork	-	-	-	1.0	0.0	-	1.1	0.2	(1.0, 1.2)	0.0	-	-
Herbs and Vegetables	-	-	-	3.4	1.4	(3.2, 3.6)	1.7	0.5	(1.6, 1.8)	3.8	1.9	(3.6, 4.0)
Fruit	-	-	-	4.6	1.9	(4.3, 4.8)	2.0	0.6	(1.9, 2.1)	2.0	1.4	(1.8, 2.2)

Table 5.27. Lifestyle survey results from student- and State Committee on Statistics -administered questionnaires, family history of cancer.

Parameter	Sumgayit (Students)			Sumgayit (SCS)			Ganja (SCS)			Lenkoran-Astara (SCS)		
	N	Est.	95% CI	N	Est.	95% CI	N	Est.	95% CI	N	Est.	95% CI
Number of Respondents	197			266			332			317		
Family History of Cancer Prevalence (%)	16	8.1	(4.3, 11.9)	13	4.9	(2.2, 7.4)	29	8.7	(5.8, 12.0)	6	1.9	(0.4, 3.4)

Chapter 6: Discussion

The findings of this study are discussed, first in relation to regional differences observed across Azerbaijan, and second in relation to the international comparisons that were made. Then, the results are examined according to cancer site, and in relation to the control of confounders. Temporal patterns are discussed in relation to the comparisons that were facilitated through the design of this study. Data quality and its relation to the interpretation of study findings are then considered. Finally, the strengths and weaknesses of this study are identified.

6.1. Regional Analyses

Regional differences in cancer burden are evaluated through the results of several analytical methods. The findings of these analyses are then discussed in light of several data quality issues.

Regional differences in cancer burden were examined through analyses of both crude and age-specific data to provide the most complete and robust study results. Because analysis of either the crude or the age-specific data has distinct strengths and weaknesses, each of these analyses must be discussed individually in terms of their particular usefulness to this study.

Crude data were recorded for the entire study period (1980-2000) and though some data are missing for certain regions/years, they still provide the most complete and long-term summary of the cancer experience in Azerbaijan. However, because the data are in crude form, the results cannot be statistically adjusted to account for differences in the age and sex distributions of the respective populations being compared. Although representing a long-term overview of cancer in Azerbaijan, the analysis can be seen as lacking in statistical rigor.

[illegible]

In contrast, age-specific data allow for a statistically robust comparison of cancer rates that controls for the factors age and sex. Unfortunately, these data are available only for all regions for the years 1995-2000, a relatively small proportion of the overall study period.

While statistically significant excesses of cancer are present in Sumgayit, it is important to note that these excesses only occur to any significant extent beginning in the early 1990s, while during the 1980s Sumgayit rates are unremarkable in comparison to the other regions. Therefore, the estimates of cancer risk obtained in Sumgayit depend largely on the time period being studied. Since the age-specific Poisson regression analyses were restricted to 1995-2000, the rate ratios produced by these analyses tend to be higher than those calculated from the Poisson regression analysis of the crude data which spans the period from 1980-2000. Because the results obtained from each of the analyses differ somewhat, the range of risk estimates obtained will be listed for each of the cancer sites studied.

Rate ratios are generally greater in Sumgayit for cancer incidence than for cancer mortality, though both measures tend to follow a similar pattern. The most profound excess risk in Sumgayit occurs for urinary bladder cancer incidence ($1.64 < RR < 2.49$), while lung cancer incidence has the next highest risk increase ($1.30 < RR < 1.67$). The category of all cancers combined demonstrates the third most elevated risk ($1.22 < RR < 1.51$). Incidence of both laryngeal ($0.93 < RR < 1.39$) and female breast cancers ($1.16 < RR < 1.21$) show moderate increases in risk.

The selected cancer sites demonstrate a similar pattern in Sumgayit when mortality is studied, though the rate ratios do not differ as substantially from unity. They can be ranked in order of decreasing risk: urinary bladder ($RR = 1.46$), all cancers combined ($RR = 1.08$), lung ($RR = 1.07$), larynx ($RR = 0.97$) and female breast ($RR = 0.96$). The estimates for cancer mortality are most likely lower than for incidence mainly because they are based on crude data for the entire study period, 1980-2000. When comparing

mortality risk estimates to those based on crude incidence data over the same period (1980-2000), the rate ratios are more similar.

Because similar risk estimates are obtained from analyses of cancer incidence and cancer mortality for the selected cancer sites, it is likely that these are reflections of the actual cancer risk in Sumgayit. Therefore, it seems reasonable to conclude that Sumgayit does demonstrate an increased risk for incidence of lung cancer, and both incidence and mortality for urinary bladder cancer and all cancers combined. Though there is some evidence for increased laryngeal and female breast cancer risk in Sumgayit, it is not as convincing as for the previously mentioned sites. These observations are consistent with a publicly perceived increased risk of disease in Sumgayit. In fact, Sumgayit demonstrates the highest incidence and mortality rates of all study regions for each of the selected cancer sites, except for female breast cancer, for which Ganja has the highest rates.

The possibility that the observed cancer rates are the result of differential cancer detection and reporting in the study regions cannot be ignored. The use of breast cancer as a control to evaluate the uniformity of cancer data recording among regions provides some evidence for better reporting in urban than rural areas, as both Sumgayit and Ganja demonstrate higher breast cancer rate ratios. However, the degree of elevation is not as great as for other cancer sites, suggesting that if differential reporting occurs, its effect is not likely to be a major one. Differential reporting would most likely occur because of regional differences in health care quality, availability, and/or accessibility. One possible explanation for regional health care disparities could be differences in the geographical distribution of medical care facilities (Morabia *et al.* 1992). Sumgayit and Ganja are large urban centres, while Lenkoran-Astara is primarily a rural area; therefore, one might expect better provision of health care in the larger centres. The low population density of rural areas may have resulted in less funds being allocated to health care in these regions, as it is often more efficient to concentrate the best medical expertise and equipment in larger centres. This expectation of improved health care quality in urban areas may partially explain the increased cancer rates in the larger cities. Access to health care may

be problematic in rural areas because of the longer distances patients are expected to travel to reach medical care (Field 2002), and the possibility that convenient transportation may not be broadly available.

The magnitude of the interregional differences observed, however, makes it difficult to believe that the disparities are entirely artifactual, as rates in the urban areas are generally double those of rural areas. It seems unlikely that only half of the cancer cases and deaths are being reported in rural regions. Indeed, it seems more probable that a number of additional factors are involved, including availability of medical expertise, "informal" referrals, and possibly social factors.

6.2. International Comparisons

Cancer incidence and mortality rates in Azerbaijan and in the Caucasus region in general, have typically been reported as being lower than the Soviet averages (Morabia *et al.* 1992, Zaridze & Basieva 1990). While data quality factors are believed to account for some portion of the disparities, lifestyle and environmental factors are also hypothesized to play a major role. Differences in lifestyle relating to cultural factors could explain a proportion of the observed differences, as the lifestyles of Muslim persons in the southern republics could potentially differ from Christian persons in the European republics. However, religious affiliations in most of the NIS are nominal making this explanation less plausible.

From the international comparisons made, it would seem that both geographic region and cultural difference play roles in influencing cancer risk. Cancer incidence rates are more similar among the Caucasus nations of Georgia, Armenia, and Azerbaijan than when compared to the Russian Federation. This result may be partially explained by similarities in certain social and economic factors, having both been member states of, and later seceded from the former USSR.

Incidence and mortality of lung cancer, female breast cancer, and all cancers combined in both Azerbaijan and Sumgayit is lower than that of either Armenia or Georgia. Georgia and Armenia are useful comparison populations because of their population sizes (which are sufficiently large for cancer rates to be reasonably stable), historical social and economic similarities, and geographic proximity to Azerbaijan. From analysis of available data, there is no evidence to suggest that either Sumgayit or Azerbaijan suffer from an increased cancer burden relative to the other Caucasus nations. However, this statement is based on the assumption that the data collected by the Ministry of Health and provided to researchers for this study are of high quality; in fact, there is some evidence to the contrary.

It must be noted that the incidence rates calculated in this study for lung, female breast, and all cancers combined for the nation of Azerbaijan match those recorded by the WHO-HFA database almost perfectly. This result is to be expected if the data provided for this study are the same as those provided to the WHO. While some small variations exist, they are not substantial enough to cause concern. This lends credibility to the calculations made in this study, and to the data provided by the Ministry of Health. Though the data may suffer from a number of shortcomings, the consistency shown between WHO-published results and those from this study supports the belief that the data used in this study are the best available.

Cancer incidence and mortality rates in the former Soviet Union, and particularly in Azerbaijan, are low relative to both the Russian Federation and the Western world, as represented by Canada (Parkin *et al.* 1997, Parkin *et al.* 1993). Two simple, but not mutually-exclusive possible reasons exist for this observation. The first is that cancer rates in Azerbaijan are indeed lower owing to some combination of decreased cancer risk, in terms of exposures and lifestyle, and/or genetic predisposition to cancer resistance. The other is that the lower cancer rates observed are not attributable to differences in risk, but rather are artifactual, because of differential reporting and/or recording of cancer data. The bulk of evidence currently favours an explanation relating to disparities in cancer data quality across nations.

Citizens of Azerbaijan live in a way that may contribute to lower cancer rates. It would appear that Azeri people eat less processed and preserved foods than their Western counterparts, and a greater proportion of their diets comes from fresh fruits and green vegetables. Because of the known cancer causing effects of diets high in dietary fat, and the cancer-fighting properties of fresh fruits and green vegetables, there is some reason to expect reduced cancer rates in Azerbaijan. However, the diets of persons of the Russian Federation and Azerbaijan are expected to be relatively similar, and unlikely to explain the large difference in cancer burden. Furthermore, the disparities we see between Canada, and/or the European Union and Azerbaijan are two- to three-fold in size, and again unlikely to be explained by marginal dietary differences.

The diets between the two nations do not seem so dissimilar as to be responsible for such a dramatic difference in cancer risk. Furthermore, the cancers most influenced by diet tend to affect the digestive tract, which were not specifically examined in this study. Therefore, this explanation does not seem plausible. There is no scientific evidence for any sort of genetic predisposition to "cancer-resistance" for people of the Caucasus region of Asia. Again, even if there were some genetic component involved, it is unlikely to account for the large differences observed.

A far more likely explanation is that the lower rates are artifactual, and occur for the most part as a consequence of disparities in the healthcare systems resulting in great underreporting of cancer in the former Soviet republics. Much less money is and was spent per capita in Azerbaijan and the former Soviet Union, respectively, than in Western nations (WHO Website – Country Profiles). It is likely that the underfunding of the healthcare system leading to poor medical facilities, equipment, and outdated training of medical staff contributes to a significant number of cancer cases and deaths being missed by the health care system. This would most likely occur through an inability to correctly diagnose oncological diseases, misdiagnoses, poor reporting of cancer cases and deaths, because a significant portion of referrals is on an informal basis, and because many patients may not seek treatment at all given their lack of financial resources.

In fact, one of the senior members of the Azeri National Oncological Centre has shared his sense that many patients who are diagnosed with cancer cannot afford treatment and are not recorded by the system (Dr. Fuad Mardanli, *pers. comm.*). Dr. Mardanli has reflected that patients do not always report their place of residence to their attending physician, and may also be omitted from the cancer records for that reason. He has further pointed out that many persons who are wealthy, influential, or affiliated with the government do not use the public healthcare system, instead receiving priority treatment for their diseases in separate medical centres reserved for the elite, and are not included in the annual reports to the Ministry of Health. Thus, though no "hard evidence" was collected in this study demonstrating that underreporting is the reason for the great disparity in cancer rates observed between Azerbaijan and western nations such as Canada, given observed patterns in cancer data and reports from within the country, it seems to be the most plausible explanation for the observed low rates of cancer.

An attempt was made to contact thirteen experts on health care and/or cancer registration in Azerbaijan via email, posing various questions that would allow for some trustworthy answers to many of the questions posed by this thesis regarding cancer data recording and reporting. Unfortunately, only two of the thirteen did respond. As such, only two opinions were given on a relatively narrow scope of the questions posed, and no strong arguments for or against the hypotheses proposed by this thesis could be made.

Further evidence of the relationship between socioeconomic factors and cancer reporting is the major drop in cancer incidence and mortality reported in the early 1990s in Azerbaijan, a period when both the population and health care system were particularly strained. It therefore seems most likely that the differences in cancer rates observed between Canada and Azerbaijan are artifactual, resulting from differential reporting.

6.3. Site-by-Site Analyses

Cancer of the urinary bladder (ICD-9: 188) is the most elevated of the selected cancer sites in Sumgayit through examination of incidence and mortality rates. PMR analyses confirm this result. A disproportionately large amount of cancer incidence (PMR = 1.33) and mortality (PMR = 1.38) in Sumgayit were caused by cancer of the urinary bladder. The unusual double-peaked pattern of bladder cancer incidence in Sumgayit in the 1990s may simply be attributable to stochastic variation, because there does not appear to be any other simple explanation. The excess of bladder cancer is not unexpected given its known associations with occupation in the chemical industry and the high levels of exposure present in Sumgayit industry.

Lung cancer (ICD-9: 162) incidence in Sumgayit is substantially elevated relative to the rest of the country, though mortality demonstrates no statistically significant excess. PMR analyses provide weak support for an excess of lung cancer in Sumgayit, both in terms of incidence (PMR = 1.05) and mortality (PMR = 1.20). Despite the absence of strong statistical evidence for several measures of risk, all estimates are above unity and suggest increased lung cancer risk in Sumgayit. Similar to bladder cancer, lung cancer is also related to occupational exposures.

The highest incidence and mortality rates for all cancers combined (ICD-9: 140-208) occurred in Sumgayit, though the risk estimates are not as high as for bladder and lung cancers. This result could be expected, given that not all cancers are strongly related to pollution and occupational exposures. Analyses examining the composite group of all cancers combined could therefore be expected to exhibit a dilution of effects, and thus produce lower estimates of risk.

Laryngeal cancer (ICD-9: 161) shows some evidence of increased incidence in Sumgayit, at least in the latter part of the study period, while estimates of mortality risk are actually below unity. PMR analyses suggest that Sumgayit actually experiences a lower than expected cancer burden, both in terms of incidence (PMR = 0.77) and mortality (PMR =

0.89). Despite some evidence for increased risk at certain points in the study period, when the entire study period is considered there appears to be little evidence for an increased laryngeal cancer burden in Sumgayit.

Finally, incidence of female breast cancer (ICD-9: 174) is moderately increased in Sumgayit, though mortality differs little from the rest of the country. The breast cancer burden in Sumgayit is slightly lower in terms of both female incidence (PMR = 0.94) and substantially lower for male and female mortality (PMR = 0.69) relative to national averages. Again, these results were predicted by the weak association of breast cancer with occupational and environmental factors.

6.4. Confounding Lifestyle Factors

Despite the identification of several methodological and practical problems in the administration of the lifestyle questionnaires that limited both the sample size and statistical rigour of the survey, the results obtained were still deemed of sufficient quality to provide reasonable estimates of the prevalence of confounding lifestyle factors. The data collected by these surveys was therefore useful in evaluating the potential confounding influences of several lifestyle factors and interpreting the risk estimates throughout.

The prevalence of male smoking among the regions examined in this study is lower (ranging from 39.7 to 67.8%) than the prevalence estimated at the national level by the Central Statistics Institute of Azerbaijan for a household budget survey (30.2%) (Corrao *et al.* 2000), while female smoking prevalence is much more comparable (0.9-13.0% from the lifestyle survey, and 1.1% from the Corrao *et al.* paper). However, the results obtained from the lifestyle survey are likely reflective of actual rates, given that only three subpopulations of the nation in predominantly urban areas were sampled. Had the lifestyle survey been conducted in all regions of the country, it seems reasonable that the results for smoking prevalence would have been much more similar to the national data obtained by Corrao *et al.* 2000.

There is little support for the argument that the elevated cancer rates seen in Sumgayit are the result of confounding lifestyle factors. Though tobacco smoking has been identified as the major cause of bladder and lung cancers, and a risk factor for several others, differential regional smoking habits do not appear to be responsible for the elevated cancer rates in Sumgayit. As determined by the lifestyle survey, male smoking prevalence, intensity, and duration in Sumgayit do not appear elevated relative to other regions. While female smoking data obtained from the SCS survey in Sumgayit suggest that the city may have a slightly higher prevalence of female smoking, this result could have occurred because of small sample sizes. At any rate, female smoking prevalence in Sumgayit is still low (~10%). It must be noted that the student-conducted lifestyle survey in Sumgayit obtained nearly identical estimates of female smoking prevalence to those obtained by the SCS for the other regions. Therefore, it does not seem reasonable to explain any differences in cancer incidence by this relatively small disparity in female smoking habits. In fact, bladder and lung cancer rates are much lower in Lenkoran-Astara despite its significantly higher male smoking prevalence than Sumgayit.

Smoking prevalences in Armenia and Georgia, are 50% and 60% respectively, and far exceed the recorded 30% among Azeri men (Corrao *et al.* 2000). A greater proportion of females smoke in Georgia (15%) than in Azerbaijan (1.1%), though data for Armenia were unavailable. Armenia demonstrates considerably higher cancer rates than Azerbaijan, while Georgia has very comparable cancer rates. Thus, differences in smoking habits do not appear to sufficiently explain differences in cancer burden among the Caucasus countries. It must be noted, however, that smoking prevalence data were collected individually in each country by local agencies. Therefore, because the collection methods were not standardized internationally, systematic errors in the data collected could potentially exist.

Smoking prevalence in Canada is similar to Azerbaijan among the men (27%), but considerably higher among women (23%) (Corrao *et al.* 2000). This may partially explain the higher cancer rates witnessed in Canada, though it seems highly unlikely that

the increased smoking among women alone can be responsible entirely. Cancer rates for both men and women in Canada are similarly elevated relative to those in Azerbaijan.

Patterns of alcohol consumption do not appear to differ in any substantial way among regions. Male drinking prevalence is high throughout Azerbaijan, and the types and quantities of alcoholic beverages consumed do not appear to vary materially. In all regions, vodka is the preferred alcoholic drink, followed by beer. The ranking of the remainder of beverages differs slightly between regions. As with smoking, female drinking prevalence is much lower than for men, and does not appear to differ by region. Therefore, it seems unlikely that patterns of alcohol consumption in Sumgayit can explain the overall excesses of cancer observed in the city.

At the international level, alcohol consumption in Azerbaijan is comparable to that of Georgia, considerably higher than Armenia, and only half that of the Russian Federation. Alcohol consumption (expressed in litres of pure alcohol consumed per capita per year) in 1996, was about 4.2 in Azerbaijan, 0.8 in Armenia, 4.5 in Georgia, and 8.1 in the Russian Federation (WHO 1999). Alcohol consumption in Canada (7.5) is only marginally lower than that in the Russian Federation. Though the similar alcohol amount of consumption in Georgia, and the higher consumption in the Russian Federation relative to Azerbaijan seem to roughly correlate to their observed cancer rates, the association does not hold true for Armenia. Although Armenia has considerably lower alcohol consumption than Azerbaijan, cancer rates are much higher. Although alcohol consumption is a risk factor for several cancers, it is not nearly as strong a factor as smoking, and would be unlikely to account for the observed international differences in cancer rates, even if the association between alcohol and cancer appeared to hold for all of the countries involved.

The sex distributions of the samples obtained for the lifestyle survey appear to be biased in favour of men for each of the study regions. Because the official demographic data from the State Committee on Statistics suggest that there are actually a higher number of females than males in the country, it would appear that the sex ratio in the sample skewed

toward males is a result of biased sampling. The most likely explanation for this bias is the patriarchal nature of Azeri society. When interviewers visited selected homes to conduct interviews, it was probably most common for the men of the household to respond to the questionnaires.

From the lifestyle survey, it appears that all of the comparison populations are of a similar age, though citizens of Sumgayit appear to have a slightly lower residence time. This may be explained by the abundance of employment in Sumgayit in the past, which encouraged persons to move to the city in search of jobs, unlike the other study areas where persons may have been more likely to live their entire lives in a single location.

Dietary patterns among the selected study regions in Azerbaijan do not show major variations. There is a high and relatively uniform prevalence of meat, as well as fruit and vegetable consumption in all regions, aside from the rather small amount of mutton consumed in Lenkoran-Astara. However, this one difference is highly unlikely to contribute in any way to the low cancer rates observed in Lenkoran-Astara. Being a predominantly Muslim country, there is little or no pork consumption in Azerbaijan. However, Azeri diets are high in other types of red meat and contain large amounts of saturated fat which has been implicated as a risk factor for certain digestive cancers. Finally, persons in all regions of Azerbaijan tend to have diets rich in green vegetables and fresh fruits, which have known cancer-fighting properties.

A summary of the observed dietary data suggest that differences in diet among regions are minimal, and unlikely to contribute to any interregional differences in cancer rates. The high consumption of dietary fat may increase cancer risk for certain digestive cancers, but is unlikely to affect in any significant way the cancer sites selected in this study. The high prevalence of fresh fruit and green vegetable consumption may aid cancer prevention at a population level, and may contribute to the relatively low national cancer rates.

Overall, the results of the lifestyle survey do not provide any strong evidence to suggest that the regional or international disparities in cancer rates observed are caused by lifestyle factors. In fact, particularly within Azerbaijan, all data collected by the lifestyle survey suggest that factors other than those related to lifestyle are responsible for the observed differences. At the international level, more significant differences in lifestyle exist, which are to be expected; however, they are not sufficient to explain the lower than expected cancer rates in Azerbaijan.

6.5. Temporal Trends

Two major temporal patterns have been identified: 1) those affecting all regions of the nation, and 2) those of Sumgayit in particular.

6.5.1. Temporal Trends in Azerbaijan

One of the most noticeable features of the cancer incidence and mortality data obtained from this study is the strong and relatively uniform temporal pattern evident for nearly all cancer sites studied. Cancer rates generally show a pattern of moderate increase through the early and mid 1980s, with a sharp increase in the late 1980s, a peak near 1990, sharp decrease through the mid 1990s, and some evidence of stabilization in the late 1990s.

Decreasing cancer incidence in the early 1990s is evident for each cancer site, and all regions of the county, though instability of the rates at the regional level makes these trends more difficult to see. Still, almost all cancers show an identical pattern of decrease over the early 1990s. Because of the disparate risk factors for each of the cancers, the difference in latent periods for the respective diseases, and the relatively homogeneous temporal distribution of risk factors in the country during the window of exposure necessary to affect the cancer rates (1980s and prior), an actual decrease in cancer risk seems unable to account for the observed changes. Furthermore, the countries most politically and economically similar to Azerbaijan, Armenia and Georgia, demonstrate nearly identical patterns of increase and decrease. All indications point to economic and

political factors, rather than cancer risk factors, being responsible for the observed changes.

The early and mid-1980s were a period of political and economic stability in the Soviet Union, and in Azerbaijan as well. The Soviet health care system in Azerbaijan, though underfunded, was generally stable and in a state of equilibrium. The sharp increase in cancer rates near the end of the 1980s may represent either an influx of funding, changes in reporting methods, or perhaps a change in coding of certain cancers. However, beginning in 1989, the Socialist state infrastructure began making the very initial shift toward a market-based system. The effects of this restructuring were profound and far-reaching, with widespread economic and social distress (Little 1998). The subsequent collapse of the Soviet Union and newfound independence for the former republics submerged the states into socioeconomic chaos for much of the early 1990s. The health care systems of these nations were not spared, as funding was cut dramatically and managers struggled to rebuild an infrastructure.

It was during this time (beginning in 1991) that cancer incidence rates in Azerbaijan drop dramatically. The trend continues until the late 1990s, as only then do incidence rates for some cancer sites show some evidence of stabilization or even modest increases. As has been discussed previously, the major decreases in cancer rates seen in the 1990s are most likely artifactual - reflecting changes in the political and economic status of Azerbaijan that have impacted the delivery of health care in the country, rather than actual variation in cancer rates.

There is little or no evidence to support the idea that the dramatic changes in recorded cancer rates taking place in the 1990s represent real increases or decreases in the numbers of new cancer cases or deaths; in fact, there is a great deal of evidence to the contrary. Cancers generally have a long induction period between exposure and initiation of a tumour, upwards of ten years for most cancers selected in this study. It is therefore nearly impossible for events associated with the break up of the Soviet Union to actually influence cancer incidence so severely in such a short time span, unlike the increases in

non-cancer mortality that have been observed (Notzon *et al.* 1998). For the correct temporal sequence to exist to influence cancer incidence, a major reduction in cancer risk would have had to occur at least 5 to 10 years prior in Azerbaijan. There is no evidence for such an occurrence, as known cancer risk factors are believed to have a homogeneous temporal distribution during this period.

It is possible that cancer mortality could have been affected considerably by the decline in the quality and availability of medical care, with the expected result being that cancer mortality would increase. However, rates in the Russian Federation decrease rather than increase during the early 1990s (Little 1998). This phenomenon may be related to the pattern seen in Azerbaijan, where cancer mortality rates do not demonstrate the dramatic decreases that cancer incidence rates do in the 1990s. One explanation for this is that even though a smaller proportion of cancer deaths were actually recorded by the healthcare system, the expected decrease in recorded rates would have been compensated for or "buffered" by the increase in the absolute number of cancer deaths occurring. If reporting of cancer deaths dropped sufficiently owing to the stresses placed on the health care system and on the financial status of potential patients, officially recorded cancer rates might incorrectly portray no change or a drop in cancer mortality, even though a strong increase was occurring in reality. For these reasons, one must not be too quick to draw conclusions from the officially recorded cancer rates.

6.5.2. Temporal Trends in Sumgayit

As has been briefly discussed above, the analysis of the data and interpretation of the results from this study are complicated by the strong temporal trends evident in the data. Throughout the 1980s, the cancer experience in Sumgayit is nearly indistinguishable from the national data, though major differences become suddenly prominent in the early 1990s. There does not seem to be any logical explanation in terms of changing cancer risk patterns to explain the sudden differentiation of rates between Sumgayit and the

national data. As with the explanation of the overall temporal patterns observed, socio-political explanations may be most appropriate.

An explanation put forth by one of the senior members of the National Oncological Centre, Dr. Fuad Mardanli, is that an influx of refugees to the city of Sumgayit in the early 1990s may have increased the population size sufficiently to significantly influence the numbers of new cancer cases and cancer deaths reported in the city (Fuad Mardanli, *pers. comm.*). This is a real possibility, as over 750,000 Azeri citizens became either refugees or IDPs following the armed conflict with Armenia in the early 1990s, many of whom fled to the larger cities of Baku and Sumgayit. While the use of cancer rates, rather than absolute numbers of cancer cases or deaths, is designed to account for changes in population size, it may not have been effective in this study because the influx of refugees may not have been recorded in the government's official census data for the city. Thus, the population of Sumgayit may have been much higher than official data suggested, and the cancer rates calculated for the city by this study may be in error, and appear higher than they actually are.

The counterpoint to this argument is that many of the refugees are not actually counted as cancer cases or deaths because they are too poor to seek medical treatment. In this instance, they would not be contributing to the number of cancer cases or deaths recorded, and would have no effect on the rates observed in Sumgayit. Yet another possibility is that the refugees are indeed being included in the census estimates, and are not recorded by the cancer registration system, and may, in fact, contribute to lower than expected cancer rates being observed in Sumgayit.

Another potential explanation may involve changing patterns of data censorship or even data fabrication. It is known to scientists that the Soviets were careful to present positive data regarding population and environmental health to the international community (Little 1998). Some data describing the extreme pollution occurring in various regions of the USSR were not published to prevent their disclosure, while others were never even "officially" acknowledged by the government (Tulchinsky & Varavikova 1996, Bulbulyan 1995). In this environment of censorship, there are even anecdotal reports of

"data cleansing" within the Republics before they were sent to Moscow to ensure the presentation of only positive reports to the central planners.

It therefore remains possible that the sudden excess of cancer seen in Sumgayit during the 1990s may have been the result of changes in data censorship patterns following the creation of the independent republic of Azerbaijan. However, it must be stated that in this study there has been no evidence of data fabrication or any overt efforts to influence the recording of cancer data in Sumgayit or any other region of Azerbaijan. Thus, the suggestion of "data cleansing" remains conjecture in the context of this study.

6.6. Data Quality

Issues of data quality are discussed for both the cancer and demographic data used in this study, and their implications for interpretation of the study findings.

6.6.1. Cancer Data Quality

Quality of cancer data is determined by two major criteria: completeness and validity. Data completeness is concerned with obtaining all cases originating in a catchment area, and properly recording them. This includes reporting cases that seek treatment outside the catchment, ensuring that no individuals are missed, and that those individuals with multiple tumours are not registered multiple times. Validity focuses on whether or not the recorded data are correct, such as whether or not cancer diagnoses were confirmed microscopically, or if data were checked following entry and coding.

Unfortunately, this study was unable to evaluate either the overall completeness or validity of cancer data collected in Azerbaijan. Doing so correctly would require the construction of a modern cancer registry in Azerbaijan, which is an expensive and time-consuming venture. Previously published reports have suggested that cancer registration in the former USSR was poor at best, and that cancer data completeness and validity were questionable (Rahu 1992). Catchment areas were often poorly defined, and referrals to Oncological Dispensaries outside catchment areas may have resulted in missed or even

multiple-recorded cases. Furthermore, the percentage of recorded cancer deaths coming from death certificates was known to vary greatly by region, suggesting missed sources of cancer deaths in certain regions. Data validity in the former USSR is generally unknown, as microscopic confirmation of diagnoses was carried out only sporadically, if at all (Zaridze & Basieva 1993), despite assurances from the local health care officers that all diagnoses were histologically confirmed (Fuad Mardanli, *pers. comm.*).

It seems reasonable to infer that the same statements apply to the nation of Azerbaijan, particularly during the period of this study (1980-1990) when it was still a Soviet Republic. It is unlikely that the cancer data quality improved during independence, given the new economic and political difficulties facing the country. In fact, available evidence suggests that the economies and health care systems of the South and Central Asian republics suffered most of all (McKee *et al.* 2002).

One of the methods that researchers in the Soviet Union have used to secure high quality cancer data was to actually build their own miniature cancer registries, by poring over original case reports (Rahu 1992). However, the creation of such “mini-registries” is problematic in that there are no established standards for building them, they cover only small regions, and are often constructed for very specific purposes. For these reasons, these registries are of limited utility to other researchers, or for future projects. Though the costs, both for the establishment as well as for ongoing-maintenance, would certainly be much larger, so too would the rewards of a population-based cancer registry.

MIR analyses suggest that the bulk of the cancer data used in this study are of reasonable quality, despite the presence of several extreme MIR estimates. The most stable MIRs occur for all cancers combined, and trachea, bronchus & lung cancer, where few observations exceed 1.0. In contrast, laryngeal cancer demonstrates large variations in MIR estimates, with several estimates reaching 4.0. These observations can be explained largely by the frequencies with which the cancers occur, as all cancers combined and lung cancer are much more common and, accordingly, possess more stable rates. Therefore, despite the presence of several questionable data points, MIR analyses generally do not give us reason to doubt the validity of the bulk of the cancer data used in

this study. These results tend to confirm that a level of quality does exist within the data collected, though their completeness may be questionable. A puzzling set of observations are the MIRs which exceed 1 for each of the cancer sites (except urinary bladder) in Lenkoran-Astara in 1999. These observations suggest that some unusual processes were at work in this region in 1999, resulting in a higher number of reported cancer deaths relative to reported incident cases. Whether this difference is real or artifactual remains to be determined, as no evidence currently exists to examine this point.

MIR estimates vary systematically among the various cancer sites being studied, though not necessarily in accordance with the known survival rates for the diseases. Lung and laryngeal cancers, known for their low survival rates (United States 5-year survival rate 13.4%) (Ries 2002) demonstrate high MIR ratios in all regions of Azerbaijan. However, MIRs in Azerbaijan are similarly high for both laryngeal and urinary bladder cancers, despite the relatively high survival rates demonstrated in the United States (5-year survival rate 67.0% and 79.8%, respectively) (Ries 2002). Breast cancer displays the lowest MIR estimates, though the results still suggest that lower survival occurs in Azerbaijan than in the United States (5-year survival rate 80.4%). This result may be explained largely by differences in the quality of health care between the two nations. A lack of access to modern medical equipment, training, and early diagnosis services (e.g., screening) in Azerbaijan may contribute to the low survival rates observed for these cancers.

Health care quality did not vary by region in Azerbaijan, as judged by MIR analyses that did not demonstrate statistically significant differences across regions. This being said, for each of the selected sites, except laryngeal cancer, Sumgayit has the lowest MIR point estimates of any region, raising the possibility that cancer treatment may be better there than in other regions. This possibility is not unreasonable, given that more resources for cancer treatment may have been allocated to this city owing to its highly industrial nature. In contrast, Ganja and Lenkoran-Astara consistently have marginally higher MIR point estimates than both Sumgayit and the national data, which may be evidence of poorer cancer treatment in these lesser developed regions. Given the relatively small and

statistically non-significant differences between regions, however, MIR analyses actually support confidence in the validity of internal comparisons being conducted within Azerbaijan.

Examining graphs of age-specific cancer rates in Azerbaijan raises issues about the completeness of cancer data reporting and/or recording. In almost all regions and time periods, age-specific incidence rates rise exponentially from the young through the middle age groups, and then drop off substantially in the oldest age groups. This is quite unlike what we see in nations with well-developed cancer registration systems such as Canada, where rates rise through middle age and plateau in the oldest age groups. One likely explanation for this is that persons in the oldest age groups with cancer are not being diagnosed correctly as often as those in Canada, possibly owing to inadequate medical training and equipment, doctors being less likely to diagnose the elderly, and/or the elderly not having access to the financial resources that would allow them to seek medical attention. In any case, the lack of reporting of elderly persons with cancer in Azerbaijan may contribute to the low cancer incidence rates observed in the country.

6.6.2. <u>Demographic Data Quality</u>

Several methods of adjusting for demographic differences among the study regions were utilized in this study to provide more robust estimates of cancer risk. These included the calculation of age-standardized rates, Standardized Incidence Ratios (SIRs), and the multivariate Poisson regression. All of the above statistical methods are based on the assumption that each of the study regions has a different demographic distribution. The primary goals of these measures are to statistically adjust the cancer rates observed in the study to ensure that differences in age and sex distributions among the populations are accounted for, and do not influence the analyses.

During the calculation of these statistics, it was noted that the population data supplied by the Ministry of Health for each of the study regions was based on an identical

demographic distribution. Although the age-sex distribution varies slightly for each year from 1980-2000, within each year, all study regions have exactly the same distribution. It would appear that for each of the years from 1980-2000, the State Committee on Statistics (SCS) used a single estimate of an age-sex distribution, likely that of the national population, to calculate the numbers of persons in each of the 5-year age groups for each of the study regions. To do so, the SCS most likely multiplied the proportion of males or females in each of the age groups in the national population by the total population size for each of the study regions to calculate the local population numbers for each of the 5-year age groups. The presence of decimal places on the numbers of persons in each of the 5-year age groups in the demographic data file supplied by the MoH is corroborative evidence that calculations have been so made. An enquiry was made to the Ministry of Health requesting clarification of this matter, but no response was received.

Because the demographic data for each of the regions are based on the same distribution, all attempts to adjust for differences in age and sex between regions are inconsequential. The statistical adjustments do not in any way improve the resolution of regional differences on a yearly basis. However, because a slightly different demographic distribution was used for each of the years in the study, calculating these measures does adjust for temporal variation in the study populations, and aids in the examination of secular trends.

The calculation of cancer rates based on these artificially created population numbers can have major and negative effects on the evaluation of regional patterns of cancer. It is both possible and likely that the absence of census data has contributed to a dilution of regional differences in cancer rates for this study. Assuming that Sumgayit had a younger population than the other regions over the study period, which is not unreasonable given its past industrial nature and abundance of employment, cancer rates in Sumgayit could have been substantially underestimated. This could partially explain the only mildly elevated cancer rates witnessed in Sumgayit.

Even more troubling is the possibility that population figures calculated by this mathematical approach are also used by the government rather than actual census counts to calculate disease rates for other or perhaps even all diseases. If so, estimates of regional disease burdens could be inaccurate (gross inaccuracies would prevail if, indeed, the actual demographic distributions of the populations differ to a significant extent). Not only could the relative burdens of disease among regions be erroneous, but the actual disease rates calculated throughout the country could be in error. Such errors could result in, among many other things, misallocation of health care resources, inaccurate disease surveillance, and erroneous assessment of the effectiveness of health care initiatives. It is therefore of the utmost importance that the Government of Azerbaijan, in particular the State Committee on Statistics and the Ministry of Health, address this important methodological issue.

6.7. Study Strengths and Limitations

Any epidemiological study has strengths and limitations that can influence the validity of the results obtained from it. These characteristics are documented here in an effort to better examine the particular usefulness of this study.

6.7.1. Strengths

The greatest strength of this study has been its utility in examining the feasibility of, and issues associated with conducting cancer epidemiology research in Azerbaijan. Through this study, numerous issues have been identified as being problematic to research, including data availability, accessibility, and data quality. Only in recent years, 1991 and beyond, have age- and sex-specific data been collected at the regional level in Azerbaijan. Prior to this time, only crude data are summarized in the Ministry of Health Archives, making rigorous analyses of pre-existing summary cancer data impossible prior to 1991.

Access to pre-existing data proved problematic, as the hardcopy records were, in many cases, unable to be secured from either the Ministry of Health, or from the local oncological dispensaries. Furthermore, the quality of the data is questionable, as problems have been identified that appear to persist from the Soviet system of health care and cancer reporting. In addition, a host of new issues arise following independence. It would appear that a significant number of cancer cases have been missed in all study regions, and that regional differences in data recording may also occur, complicating any analyses of regional disparities in cancer rates.

The study has demonstrated that international partnerships can be successfully formed in order to complete health research in Azerbaijan. Buy-in from a large number of national and international agencies was secured, and numerous agencies have worked collaboratively to facilitate the progress of this work. However, over the course of the study, participation by several parties in Azerbaijan has decreased substantially. Attempts to make contact with the National Oncological Centre and the Ministry of Health in the months following departure from Azerbaijan have been unsuccessful. Thus, although the bulk of the work for the study has been completed, the difficulty of keeping the momentum of the collaboration beyond the time of the field work necessary to collect the data has been noted. Furthermore, ensuring a sense of co-ownership of the study and a full appreciation of its broader significance and value for the development of epidemiological research and evidence-based policy making in the country appear to be important challenges. Investigators developing new collaborative research projects should pay close attention to these issues.

6.7.2. Limitations

The most prominent limitation of this study is its inability to make strong conclusions about cancer risk in Sumgayit, owing to, in large part, issues of data quality and availability. Although cancer risk appears to be elevated in Sumgayit, there are a number of reasons to question the accuracy of the findings; thus, the results of this study must be

interpreted cautiously. Despite its shortcomings, however, this study does provide the first quantitative assessment of the cancer burden in Sumgayit and, as such, represents the best available knowledge on cancer burden in Sumgayit at present.

What may also be seen as a limitation of this study is the only partial success of the capacity building initiative. Several delays, in securing necessary approvals, obtaining data, and completing the analytical portion of the study, as well as the writing the thesis, likely contributed to a sense of distance between local partners in Azerbaijan and the researchers both in Canada and Italy. Ideally, the study could have been completed in a more timely fashion. In so doing, increased momentum would have helped to maintain a better sense of engagement by partners in Azerbaijan, and perhaps could have resulted in a more successful capacity building initiative. This being said, there are a number of other factors, discussed in the next paragraphs, which also could be seen as contributing to the challenge of capacity building.

Through the conduct of this study and the jointly-sponsored WHO-UNDP epidemiology courses, scientific expertise and epidemiological knowledge were imparted to a number of local experts in Azerbaijan. Practical experience was gained by several Azeri experts during the conduct of epidemiological research, including the administration of questionnaires, participation in data collection, and planning of the research. It was hoped that these local experts would then use the knowledge they had gained to propose and conduct new health research in Sumgayit, or elsewhere in Azerbaijan. However, it appears that more investments into human resource development, provision of scientific guidance, and additional opportunities for practicing epidemiological research will be necessary for this change to occur.

Though several reasons can be cited for this shortcoming, the most important is likely the current economic situation in Azerbaijan. Unemployment is high and wages are low, and, as such, the local researchers trained during this project have experienced a constant financial struggle. In order maintain financial security, these persons have had to hold one or more (often non-academic) jobs at all times. Consequently, they have had little

time and/or resources to spare for academic endeavours, particularly the unpaid ground-breaking stages of a research project: developing a study design and completing grant applications. Consequently, the two local experts most closely involved in the conduct of this research have since obtained other employment following the end of their contract with UNDP/WHO, and have not been able to further their training or propose new research.

Research funding does exist from within the country but, owing to the present economic situation, which makes very few resources available for research, the bulk of funding is provided by international donors and non-governmental organizations (NGOs), and it is difficult to secure independently. Reliance on foreign sources of funds for research poses major challenges to the emerging generation of young researchers, as it requires them to compete with other scientists in the international arena; unfortunately, without possessing all the necessary tools and skills (including linguistic ones) to meet tough international research standards and selection criteria. Consequently, developing support systems to aid new investigators with study design and planning, as well as training them to better compete for international funding should be seen as part of a long-term commitment to the development of the country's scientific capacity.

Developing a strong research infrastructure in Azerbaijan, including such governmental organizations as the MoH, would go a long way to aiding new researchers in the search for research projects and funding. It is to be hoped that the Ministry of Health will develop a strong and growing interest in assisting these researchers. By the government taking an active role as a partner, capitalizing on the results of past and present studies for use in further research, developing information systems which can be used to inventory and study environmental and health data for the country, and adopting policies which make the best possible use of available evidence, the agendas of science, public health, and government can be moved ahead concurrently.

Chapter 7: Conclusions and Recommendations

7.1. Conclusions

Conclusions drawn from this study are summarized in several sections: cancer risk, data quality, and capacity building.

7.1.1. Cancer Risk in Sumgayit and Azerbaijan

All conclusions about cancer risk drawn from this study must be considered in light of data quality and completeness issues. At present, while the available population-level data are not of sufficient quality to conduct rigorous epidemiological research, careful study design allows limited conclusions to be drawn. Issues of data quality, completeness, and availability make it difficult to draw extensive conclusions about cancer risk in Azerbaijan, and even more so for the city of Sumgayit. That caveat being made, the data used in this study are the best currently available, and thus, the findings of this study are worthy of consideration.

From all available evidence, it appears that cancer incidence and mortality rates are indeed higher in Sumgayit than in selected other regions of the country, and the nation as a whole. Internal comparisons are believed to be valid although the data used are admittedly imperfect. The excess of risk observed in Sumgayit varies by cancer site.

The primary goal of this study was to evaluate the potential health effects of long-term occupational and environmental exposures for the residents of Sumgayit. The observed patterns of cancer incidence and mortality do not provide strong evidence for an association between *environmental* exposures and cancer in Sumgayit. If environmental exposures played a major role in carcinogenesis in Sumgayit, one might expect to see more pronounced excesses of cancer burden in the city.

Instead, several of the selected cancers observed are elevated, but not as high as one might expect if the entire population of the city was experiencing significant carcinogenic exposures. Rate ratios for most cancers selected hover in the 1.5 range relative to the remainder of the country, with the exception of urinary bladder cancer (RR = 2.49). If the entire population had been exposed to dangerous levels of carcinogenic agents, one might expect much higher point estimates in the form of rate ratios to be observed, with or without statistical significance. From the available evidence gathered by this study, it appears that any increased cancer burden in Sumgayit results from *occupational* carcinogens that have affected but a fraction of the overall population of the city.

At present, the only way to accurately evaluate the cancer experience in Sumgayit without the complications involved in using existing data, including potential censorship, data quality, and data availability issues, may be to conduct one or more case-control studies in the city. Urinary bladder cancer has been implicated in particular because of the high rate ratios witnessed in Sumgayit, though studies evaluating lung and laryngeal cancer incidence would also be of great interest. Not only would such studies evaluate whether excesses truly exist for these cancers among certain segments of the population, but they could be of great help in identifying specific exposures of concern. Unfortunately, finding sufficient numbers of newly incident cases could prove problematic given the relatively small number numbers of incident cases currently observed in the city annually.

Neither rates in Sumgayit nor Azerbaijan are significantly higher than those of the neighbouring countries of Armenia and Georgia; in fact, all indications are that the rates are quite comparable, if not slightly lower in Azerbaijan. International comparisons to such countries as Canada and the Russian Federation suggest cancer rates in Azerbaijan are two- to three-times lower. Consequently, there is currently no evidence from this study to suggest increased cancer risk in the nation of Azerbaijan as a whole. This statement is based on the assumption that differential cancer reporting and/or recording among nations does not affect international comparisons; however, when current best evidence is considered, it seems likely that cancer data quality and completeness may

vary significantly among nations. In fact, future research utilizing more advanced methods and/or better data may indeed find different patterns than those found in this study.

7.1.2. <u>Data Quality</u>

Currently available summary cancer data in Azerbaijan are questionable at best, and at worst, may not be suitable at all for use in epidemiological research. This study focused on regions of Azerbaijan for which cancer data were believed to be available and readily accessible; however, even for those regions for which data were expected to be complete, large proportions of data were missing. Further, age- and sex-specific cancer data were collected in Azerbaijan beginning only in 1991. Therefore, researchers requiring age- and sex-specific rates prior to this point will be required to manually sift through individual cancer case reports, effectively building mini-cancer registries. Currently available data are all in hardcopy form, which further complicates the retrieval of needed information. Thus, conducting population-based cancer research based on administrative records in Azerbaijan presents serious challenges at present.

Strong temporal trends in the data believed to be related to political and economic factors confuse the examination of cancer burden over the study period. The low cancer rates also observed during this time suggest that a significant proportion of cancer cases and deaths have been missed by the system, both at present and in the past. A further complication has been the discovery that the regional demographic data provided by the Ministry of Health are based on a single population, and are thus erroneous, making it impossible to adjust for demographic differences between study populations.

The low quality of, and poor access to cancer and demographic data in Azerbaijan at present, has seriously impacted the potential strength of this study. It is imperative that such issues be addressed as soon as is possible for meaningful cancer research (and health research more broadly), to be undertaken in Azerbaijan in the future.

7.1.3. Capacity Building

This exercise provides a basis for demonstrating health research capacity in Azerbaijan. Though several problems were encountered during the study, the successful completion of the project demonstrates that international researchers can indeed conduct cancer research in Azerbaijan. While data quality remains problematic, both the necessary governmental approvals and participation to accommodate a scientific study have been demonstrated, which we hope will encourage future research in the country.

Capacity building through direct cooperation between local and international researchers was necessary for the successful completion of this study. Local researchers provided the expertise necessary for obtaining, collecting, and interpreting local data, while international researchers offered expertise in the scientific method, and access to resources not available in the local setting. Unfortunately, the end goal of capacity building (the proposal and conduct of new research by local experts trained through this exercise) has not yet been achieved. Economic hardships continue to plague the country and make it difficult for researchers to independently propose and conduct research.

Assistance and long-term commitment from the international development community will be necessary in developing human resources for epidemiological research. Investing in the training of young scientists to make them more competitive in the international arena (e.g., by establishing research and training projects in collaboration with leading academic institutions, providing the means to achieve financial security for those professionals engaged in research studies, and in further developing the capacity of local researchers to think strategically) would be invaluable to advancing a research agenda in the country.

Furthermore, encouragement and assistance provided by the Ministry of Health to these researchers, in the context of a broad strategic vision of the role to be performed by health research, will be of paramount importance in achieving these scientific and

capacity-building goals. Such efforts would create an environment which encourages and rewards independent and innovative thinking and initiative-taking.

Although some problems were encountered in this study, cooperation between local government, international organizations, and academic institutions has resulted in the successful conduct of epidemiological research in Azerbaijan. This model could be applied to future health studies in Azerbaijan, and in other areas of the developing world. Through such collaboration, the necessary elements for a successful scientific study can be secured: data, funding, and scientific expertise. However, understanding, cooperation, and long-term commitment from all parties involved are necessary for such a project to succeed, which may in some instances be difficult to secure. Still, such collaborative efforts may, in fact, be the best, if not only, method at present by which meaningful health research can be conducted in many parts of the world.

7.2. Recommendations

Several recommendations to further cancer research and prevention in Azerbaijan can be made from the results of this study, including: suggesting future research, enlisting international cooperation to advance health care and research in the nation, and establishing a national cancer registry,. Each point is developed below:

7.2.1. Future Research

Because of the issues of poor data quality and availability in Azerbaijan at present, studies utilizing previously collected summary cancer data are discouraged. Instead, studies collecting and analyzing new data are more likely to produce scientifically meaningful results at present.

Case-control studies may be the best method of evaluating cancer risk in the city of Sumgayit, and in Azerbaijan as a whole, for several reasons. Case-control studies do not rely on summary level health records. Instead, they utilize information from individuals,

both cases and controls. Thus, all data collected regarding cancer diagnoses and exposures of interest can be screened for quality and completeness before being used in the study, ensuring the use of only high-quality data. Also, case-control studies do not require the use of demographic data, which is helpful given the known problems with the demographic data currently available in Azerbaijan.

A case-control study examining urinary bladder cancer would be an excellent second step for cancer research in Sumgayit. Cancer of the urinary bladder has been implicated through this study as having the most elevated incidence of any of the selected cancers in Sumgayit. Given its known associations with occupational chemical exposures, it seems a likely candidate for an occupational case-control study. Such a case-control study would likely have to be conducted over a number of years in order to collect a sufficient number of cases for the study to have satisfactory statistical power, as there are often less than 10 new urinary bladder cases reported annually in Sumgayit (See *Appendix III – Cancer Incidence and Mortality Rates*).

Future case-control studies may also wish to examine lung, laryngeal, or female breast cancers in Sumgayit. The results of such research could be invaluable to IARC for its Cancer Monographs for the classification of potential carcinogens, and in general, to examine the effects of long-term, high-intensity exposures on human populations. The conduct of these or other case-control studies would not be overly complex, and would represent a logical next step for the Azeri researchers.

Another project that would be useful to the study of cancer in Sumgayit and Azerbaijan would be the evaluation of the completeness and validity of cancer data recorded by the Ministry of Health over the past several decades. Such a study could occur in conjunction with the creation of a cancer registry, by poring over individual cancer histories to build complete records of cancer in Azerbaijan. The results of this proposed research would be useful for explaining many of the temporal and regional trends evident in the data collected for the current study, and for advancing cancer knowledge more broadly in the nation.

7.2.2. International Cooperation and Capacity Building

Perhaps the best way to conduct future research in Azerbaijan, and other regions of the developing world would be through a similar model to this study, in which international donors and researchers team up with local experts and government agencies to investigate issues of both local and international importance. One of the keys to promoting high-quality epidemiological research and the continued development of science in these countries must no doubt be the building of local capacity. This will require full, open, and visionary participation by both international and local agencies, including the government, to create the necessary atmosphere for such initiatives to thrive and be sustainable. Particularly during their infancy, such programs are fragile and can easily be derailed by a lack of cooperation. It is therefore imperative that partners work together to achieve common goals, and in so doing, benefit everyone involved.

Given the current economic conditions in Azerbaijan, it seems that any meaningful progress towards advancing cancer prevention and research programs, and health care in general, will remain largely dependent on continued funding and support from international donors. One such example is the production of a textbook by the WHO describing the conduct of epidemiological research in a nation such as Azerbaijan. While the textbook is destined primarily for use in the Azeri universities, the principles and methods described within can be useful to a range of researchers and health professionals.

From this study, we strongly recommend international donor investment in cancer research in Azerbaijan for a number of reasons. Sumgayit, in particular, represents a unique opportunity to study intense and long-term human exposures to a number of industrial chemicals and processes. The results gleaned from future cancer research in Sumgayit could be invaluable for identifying carcinogens, understanding human responses to alleged high-level and long-term exposures, and for understanding the effects of exposure cessation on future cancer risk.

7.2.3. Electronic Data Collection and Health Information Systems

The use of standardized electronic data databases to collect new cancer data, and health data more broadly, would be invaluable to the conduct of future research in Azerbaijan. In electronic form, data are more uniformly collected, easily summarized, examined, and analyzed to produce useful results for either research, administrative, or policy-making purposes. Detailed analyses of multivariate systems and interactions among the variables can be accomplished with little effort, and much faster than more traditional methods utilizing hardcopy health records. Data quality can be quickly assessed, and any errors in the recorded data can be corrected relatively easily.

The set-up and maintenance of such electronic health information systems would be aided greatly by assistance from international organizations with experience in the field. An example of such international involvement currently in progress is the South Caucasus Health Information Project conducted by the Canadian Society for International Health. Cooperative efforts involving such organizations, and particularly those linking health and environmental information systems would open many new opportunities for research, particularly examining the suspected linkages between adverse human health effects and environmental pollution.

7.2.4. Establish a National Cancer Registry

Establishing a population-based cancer registry would be a great investment in research on cancer in Azerbaijan at a number of levels. Properly established cancer registries are an invaluable tool for epidemiologists because they represent an easily accessible source of high quality cancer data for well-defined populations. From these data, epidemiologists can easily calculate incidence and mortality rates, and examine time trends. With complete and up-to-date follow-up, cancer prevalence may also be determined. Epidemiologists can obtain cases from cancer registries for case-control studies, evaluate particular environmental/occupational exposures, and compare the cancer burden among different ethnic groups/geographic regions. Such a registry would

provide the most accurate picture of the cancer experience in Azerbaijan and, through so doing, would greatly aid the allocation of health care research and treatment in the nation.

The underlying premise on which such a registry would operate is to collect specific information in standardized form from all cancer cases in a specific population over a specific period of time. In order to be effective at achieving its goal, the registry would have to be based on several key requirements: 1) the catchment population must be clearly defined and accessible, 2) reliable data on population numbers must be available in order to provide denominators for rate calculations, 3) medical care and correct, histologically-confirmed diagnoses must be available to all citizens to ensure that all cases are collected and verified, providing accurate numerators, and 4) case-finding sources must be readily accessible to the registry, both in the catchment and in surrounding areas.

The quantity of data collected by different registries may vary depending on available resources; however, the emphasis should always be placed on collecting quality data. There are several pieces of data that should routinely be collected by a cancer registry, including: 1) registration number – a unique number given to each individual, 2) identification items, such as name, age, and date of birth, 3) patient address (in order to determine residency status), 4) incidence date (time of first diagnosis of cancer), and finally, 5) information detailing the most valid basis of diagnosis.

Despite the benefits that the construction of a cancer registry in Azerbaijan would confer on cancer research and prevention in the nation, one must remain practical and aware of the overall health care situation in the nation. The health care system of Azerbaijan is woefully underfunded at present, and suffers from a lack of modern medical expertise and equipment. Recognizing that large proportions of the population do not have sufficient access to basic medical services or even safe drinking water, it may seem frivolous to spend large amounts of money establishing and maintaining a cancer registry. Despite the benefits that such an initiative would have for cancer research, prevention, and resource allocation, at present, other investment initiatives may provide

more immediate results in terms of overall population health. The possibility of prioritizing resources is beyond the scope of this thesis.

7.2.5. Remediation Efforts

One of the initial study goals was to provide recommendations for the remediation of environmental and occupational pollution in Sumgayit. Unfortunately, from this study no specific remediation efforts can be recommended, because it has been unable to conclusively identify any exposure-cancer relationships of particular concern. Future studies could aid greatly in this area, but until such research is undertaken, remediation should focus on the numerous environmental issues that have already been identified (SCE 1998, SCER, *unpublished data*).

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Appendices

Appendix I: Cancer Data Forms

Кому представляется Азербайджан ССР
наименование
[illegible]
адрес получателя

0614156	
1	2
формы документа по ОКУД	организации составителя документа по ОКПО
КОДЫ	

СТАТИСТИЧЕСКАЯ ОТЧЕТНОСТЬ

Отчет-вкладыш № 6

(к отчету лечебно-профилактического учреждения)

Утвержден постановлением Госкомстата СССР от 19.01.89 № 40

Представляют онкологические диспансеры (онкологические институты, имеющие диспансерное отделение), больницы (необъединенные поликлиники), имеющие онкологические отделения (кабинеты).

Республика Азерб. ССР

АССР, край, область

Район Ленкоран району

Организация (учреждение) Онколожи диспансер

ОТЧЕТ О БОЛЬНЫХ ЗЛОКАЧЕСТВЕННЫМИ НОВООБРАЗОВАНИЯМИ за 1989 г.

(2000) 1. Сведения о числе впервые зарегистрированных злокачественных новообразований*)

Локализация опухоли	№ строки	Шифр по МКБ IX пересмотра	Число впервые выявленных заболеваний: м	Число впервые выявленных заболеваний: ж	Диагноз, подтвержденный морфологически
А	Б	В	1	2	3
Злокачественные новообразования — всего	1	140—208	57	68	101
в том числе у детей до 14 лет включительно	2				
Из общего числа—злокачественные новообразования: губы	3	140	1	–	1
полости рта и глотки	4	141—149	3	4	5
пищевода	5	150	11	5	10
желудка	6	151	17	8	20
ободочной кишки	7	153	2	4	4
прямой кишки, ректосигмоидного соединения, ануса	8	154	1	2	3
гортани	9	161	3	1	3
трахеи, бронхов, легкого	10	162	3	11	11
костей и соединительной ткани	11	170, 171	1	–	1
меланома кожи	12	172	1	–	1
другие новообразования кожи[1]	13	173	1	–	1
молочной железы	14	174, 175	–	14	14
шейки матки	15	180	×	6	6
тела матки	16	182	×	1	1
яичников	17	183.0	×	2	2
предстательной железы	18	185	1	×	1
мочевого пузыря	19	188	2	–	2
щитовидной железы	20	193	–	–	–
злокачественные лимфомы	21	200—203	2	1	3
лейкемии	22	204—208	1	3	–
прочие			8	6	12

* Заполняется областным, краевым, республиканским АССР и ССР без областного деления онкологическим диспансером (отделением) на основании полученных от учреждений системы МЗ СССР и других ведомств «Извещений о больных с впервые в жизни установленным диагнозом рака или другого злокачественного новообразования» (ф. № 090/у).

[1] Исключая кожу молочной железы и половых органов.

Челябинское отделение РППО «Союзбланкоиздат», 2и4, (96), 12.05.89 г., т. 45200. Мндсс. ПВО. З. 1441.

Figure AI.1. Soviet cancer data form: sex-specific number of new cancer cases- part 1 (1989).

[2001] Из общего числа впервые выявленных злокачественных новообразований (гр. 1 и 2 стр. 1) Были ... множественных опухолей 1 [ ], из них возникли синхронно [ ].

Выявлено больных с cr:n situ 4 [ ] в том числе шейки матки 5 [ ].

Из общего числа впервые выявленных заболеваний (гр. 1 и 2 стр. 1) — у сельских жителей 6 [82].

[2100] 2. Контингенты больных злокачественными новообразованиями, состоящих на учете онкологического учреждения

Локализация опухоли	№ строки	Шифр по МКБ IX пересмотра	Взято на учет в отчетном году: больных с впервые в жизни установленным диагнозом	Взято на учет в отчетном году: в том числе выявленных при профилактических осмотрах и всеобщей диспансеризации населения	Из числа больных с впервые в жизни установленным диагнозом (гр. 1) имели стадию заболевания: I—II	III	IV	Состоит на конец отчетного года	Из них состоящих на учете с момента установления диагноза 5 и более лет
А	Б	В	1	2	3	4	5	6	7
Злокачественные новообразования—всего 323	1	140—208	125	25	56	33	19	330	154
в том числе у детей до 14 лет включительно	2								
Из общего числа—злокачественные новообразования: губы 12	3	140	1	1	1	–	–	13	6
полости рта и глотки 6	4	141—149	6	6	5		1	11	3
пищевода 16	5	150	16		2	8	2	15	4
желудка 38	6	151	25		3	13	4	40	18
ободочной кишки 4	7	153	6		4		2	10	2
прямой кишки, ректосигмоидного соединения, ануса 9	8	154	3		3			10	3
гортани 14	9	161	4	2	3	1		13	5
трахеи, бронхов, легкого 11	10	162	14	2	3	4	4	13	
костей и соединительной ткани 9	11	170, 171	1	1	1			6	5
меланома кожи	12	172	1	1	1	–		–	
другие новообразования кожи[1] 64	13	173	1	1	1			57	34
молочной железы 25	14	174, 175	14	4	10	2	2	33	18
шейки матки 34	15	180	6	3	3	1	2	33	24
тела матки 29	16	182	1	1	1			29	12
яичников 6	17	183.0	2	-	2			5	
предстательной железы 1	18	185	1		1			1	
мочевого пузыря 1	19	188	2		2			2	
щитовидной железы 3	20	193						3	1
злокачественные лимфомы 25	21	200—203	3	2	3	–	–	25	10
лейкемии 2	22	204—208	4	–	-	–	–	-	–
Прочие 11			14	3	7	4	2	11	9

[2110] Из числа состоявших на учете онкологического учреждения (гр. 6 отчета за предыдущий год (для отчета за 1989 г. — гр. 7) и гр. 1 за отчетный год) число выехавших из района деятельности онкологического учреждения 1 [19]; число лиц, у которых диагноз злокачественного новообразования не подтвержден 2 [4]; число больных, о которых онкологическое учреждение не имело сведений в течение года 3 [ ]; из числа состоящих на учете на конец года (стр. 1 гр. 6) — сельские жители 4 [208].

Из числа больных с впервые в жизни установленным диагнозом, выявленных при профилактических осмотрах и всеобщей диспансеризации населения (гр. 2), имели I—II стадию заболевания 5 [ ]; из них больные с визуальными локализациями опухоли 6 [ ].

В данном году взято на учет больных с ранее установленным диагнозом злокачественного новообразования (шифры 140—208) 7 [ ].

Figure AI.2. Soviet cancer data form: sex-specific number of new cancer cases- part 2 (1989).

[2200] 3. Сведения об умерших от злокачественного новообразования

Локализация опухоли	№ строки	Шифр по МКБ IX пересмотра	Число умерших в отчетном году	Из числа впервые взятых на учет в предыдущем году умерло до 1 года с момента установления диагноза*
А	Б	В	1	2
Злокачественные новообразования — всего	1	140—208	90	33
в том числе у детей до 14 лет включительно	2		–	–
Из общего числа—злокачественные новообразования:				
губы	3	140	–	–
полости рта и глотки	4	141—149	1	1
пищевода	5	150	12 (5)	3
желудка	6	151	15 (8)	10
ободочной кишки	7	153	2 (1)	2 (1)
прямой кишки	8	154	2	2
гортани	9	161	5	1
трахеи, бронхов, легкого	10	162	12	4
костей и соединительной ткани	11	170, 171	4	–
меланома кожи	12	172	1	1 (1)
другие новообразования кожи	13	173	(8)	– (1)
молочной железы	14	174, 175	5 (1)	1 (1)
шейки матки	15	180	6 (1)	1
тела матки	16	182	1	–
яичников	17	183.0	3	–
предстательной железы	18	185	1	1
мочевого пузыря	19	188	1	–
щитовидной железы	20	193	–	–
злокачественные лимфомы	21	200—202	3	–
лейкемии	22	204—208	6	4
Прочие			10 (40)	2

*) В течение отчетного и предыдущего года.

[2210] Число умерших, не состоявших на учете онкологического учреждения 1 [ ] 28, из них умерших, диагноз которым был установлен посмертно 2 [—], в том числе при вскрытии 3 [—]; состояли на учете в ведомственных лечебно-профилактических учреждениях 4 [—].

Число умерших больных со злокачественными новообразованиями, причиной смерти которых послужило другое заболевание 5 [5]

Из числа впервые учтенных в предыдущем отчетном году больных, умерших от осложнений, связанных с проведенным лечением 6 [3].

Figure AI.3. Soviet cancer data form: number of new cancer deaths (1989).

[2300] 4. Сведения о лечении больных злокачественными новообразованиями, подлежащих специальному лечению (II клиническая группа)

Локализация опухоли	№ строки	Шифр по МКБ IX пересмотра	Число больных, в отчетном году взятых на учет и закончивших специальное лечение	В том числе с использованием методов				
				только хирургического	только лучевого	только лекарственного	комбинированного или комплексного	химиолучевого
А	Б	В	1	2	3	4	5	6
Злокачественные новообразования — всего	1	140—208	96	17	20	12	24	17
в том числе у детей до 14 лет включительно	2							
Из общего числа злокачественные новообразования:								
полости рта и глотки	3	141—149	5	2	3			
пищевода	4	150	10	1	8	2	2	8
желудка	5	151	16	4		3	10	3
прямой кишки, ректосигмоидного соединения, ануса	6	154	3	2			3	
гортани	7	161	4	2	3		1	2
трахеи, бронхов, легкого	8	162	7		3		5	4
меланома кожи	9	172	1	1				
молочной железы	10	174, 175	12	2	2		8	
шейки матки	11	180	4	4	4			
тела матки	12	182	1	1			1	
яичников	13	183.0	2	1	1	1		
мочевого пузыря	14	188	1	1				
лимфатической и кроветворной ткани	15	200—208	7		2	5		2
			23	4	10	6	2	1

[2310] Из числа подлежащих специальному лечению: продолжают лечение в отчетном году (не закончили) 1 [ ]

отказались от лечения 2 [—], в том числе с I—II стадией заболевания 3 [ ] имели противопоказания к проведению лечения 4 [—], в том числе с I—II стадией заболевания 5 [ ].

Из числа закончивших специальное лечение лечились только амбулаторно 6 [16].

Общее число больных (независимо от стадии заболевания), закончивших в течение года: лекарственное лечение (включая сочетание с другой терапией) 7 [39], в том числе больных злокачественными новообразованиями лимфатической и кроветворной ткани 8 [7], лучевую терапию 9 [38]

«31» декабр 1989 г. Руководитель

Морнцева Г. М. Тел. 5-51-19

фамилия, и № телефона исполнителя

Figure AI.4. Soviet cancer data form: data on treatment of cancer patients by clinical group (1989).

"Статистика һаггында" Ганунун 7-чи вә 10-чу маддәләринә көрә бүтүн мүәссисә, идарә вә тәшкилатлар һабелә физики шәхслər мүәјјәнләшдирилмиш гајдада дөвләт статистика органларына һесабат вермәјә борҹлудурлар. Һесабаты тәгдим етмәјән һүгуги вә физики шәхсләр мадди мәс'улијјәтә ҹәлб едилирләр, мәс'улијјәтә ҹәлб етмә онлары һесабат тәгдим етмәкдән азад етмир. Статистика мүшаһидәләринин, һабелә учот ваһидләринин дөвләт реестринин апарылмасы үчүн зәрури олан мә'луматлары тәгдим етмәмә, јахуд вахтында тәгдим етмәмә вә ја һәмин мә'луматлары тәһрифетмә бу әмәл еjни һәрәкәтләр үчүн инзибати тәнбеһ едилдикдән сонра ил әрзиндә јенидән төрәдилдикдә вә ја ejни мүддәтә ... [illegible] ... вә ја минимум әмәк һаггы мәбләғинин јелдән јүз мислиндән сәккиз јүз мислинәдәк мигдарда ҹәримә илә ... [illegible] (Азәрбајҹан Республикасынын Ҹинајәт Мәҹәлләсинин 172 - 2-чи маддәси)

ДӨВЛӘТ СТАТИСТИК ҺЕСАБАТЫ

1	2	3	4	5	6
ИСТ үзрә сәнәд формасынын	ИТТ үзрә сәнәд тәртиб едән тәшкилатын, мүәссисәнин вә с.	ДИОГС үзрә назирлијин (баш идарәнин), бирлијин ассосиасијанын	ИӘОГС үзрә МР-нын, рајонун шәһәрләрин	Фәалијјәт нөвләри үзрә	МФСТ үзрә мүәссисәнин (тәшкилатын) мүлкијјәт (тәсәррүфатчылыг) формасынын
КОДЛАРЫ					

Кимә тәгдим едилир

Гәбул едән тәшкилатын ады

Гәбул едән тәшкилатын үнваны

Республика

Рајон

Идарә (мүәссисә)

7 N: форма
БӘДХАССӘЛИ ЈЕНИТӨРӘМӘЛӘР ҺАГГЫНДА ҺЕСАБАТ

Азәрбајҹан Дөвләт Статистика Комитәсинин 30 нојабр 1998-чи ил тарихли 31/5 N:-ли гәрары илә тәсдиг едилмишдир

Почтла – иллик

Тәгдим едирләр: Республика вә башга онколожи диспансерләр бәдхассәли шишлә хәстәләнмиш шәхсләрин әрази, гејдијјатыны апаран вә бу мәгсәдләр јени ашкар олунмуш хәстәликләр һаггында мә'луматы олан јухары сәһијјә органларынын көстәриши илә әрази сәһијјә идарә органына, республика-мүәјјән олунмуш мүддәт әрзиндә. Әрази сәһијјә идарә органынын пајтахт шәһәр, республика үзрә һесабат. Сәһијјә Назирлијинә вә республика статистика органына мүәјјән олунмуш мүддәт әрзиндә

Сәһијјә мүәссисәсинин ады вә нөвү: [illegible]
(гејд етмәк: саһә, рајон, мәркәзи, шәһәр, республика. Тибби санитар һиссәләри үчүн истеһсалын саһәси)

Республика: Азербайджан

Рајон: [illegible]

Јашајыш мәнтәгәси: Азербайджан проспект 111

сәһијјә мүәссисәсинин үнваны

« 07 » « [illegible] 200_ » 199__ ил Рәһбәр [signature]

Ичрачынын вәзифәси, Ады, Сојады вә телефон №-си [illegible]

Figure AI.5. Azeri cancer data form #7: number of new cancer cases by age and sex – part 1 (2000).

Азәрбајҹан Республикасы Сәһијјә Назирлији
Информатика вә Статистика Идарәси
Тел.: 93 63 92; Факс: 93 76 47;

Бәдхассәли шишлә хәстәләнмиш шәхсләрин ҹинсә, јаша вә шишләрин локализасијасына көрә бөлүнмәси

Бәдхассәли шишләрин локализасијасы	IX бахыш ХБТ үзрә шифр	Ҹинси	Сыра №-си	Гејдијјата алынан хәстәләрин үмуми сајы	О ҹүмләдән бу јашда олан хәстәләрдә															
					0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75 вә јухары
А	Б	В	Г	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Бәдхассәли шишләрин ҹәми	140-208	к	1	23									2	2	6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		г	2	58								2	2	3	5	[illegible]	8	[illegible]	[illegible]	[illegible]
о ҹүмләдән. Додагларын	140	к	3																	
		г	4																	
ағыз бошлуғунун	141-145	к	5																	
		г	6	1												1				
Удлағын	146-148	к	7	1											1					
		г	8																	
Гида борусунун	150	к	9	6											2		1		2	1
		г	10	3												1		1		1
мә'дәнин	151	к	11	15									2	2	2		2		2	3
		г	12	6												2		2	2	
чәнбәр бағырсағын	153	к	13	2												1	1			
		г	14	5														1	3	1
дүз бағ-ын, дүз сигмаја бәнзәр бирләш-нин, анусун	154	к	15	1													1			
		г	16	1														1		
Гарачијәр вә гарачијәр дахили од ахачагларын	155	к	17	5												2	1	1	1	
		г	18	4												1	1	1	1	
мә'дәалты вәзинин	157	к	19	2														1		1
		г	20	2													1		1	
бурун бошлуғунун, орта гулағын вә әлавә бошлуғларын	160	к	21	–													–	–		
		г	22	–													–	–		
Гыртлағын	161	к	23	2												1		1		
		г	24	3											1	–	1	1		
Трахеја, бронх, ағҹијәрин	162	к	25	3											1	1		1		
		г	26	8												2	1	2	2	1
сүмүк вә ојнағ гығырдағынын	170	к	27	1														1		
		г	28	2													1	1		
Бирләшдиричи вә башга тохумаларын	171	к	29																	
		г	30																	
Дәринин меланомасы	172	к	31																	
		г	32																	
Дәринин дикәр јени төрәмәләри	173	к	33																	
		г	34																	

7№ Форма – Сәһифә 2

Figure AI.6. Azeri cancer data form #7: number of new cancer cases by age and sex – part 2 (2000).

А	Б	В	Г	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Гадын суд вәзисинин	174	г	35	6										1	1				1	
Ушаглыг бојнунун	180	г	36	2										1	1					
Чифтин	181	г	37	–																
Ушаглыг чисминин	182	г	38	–											1	1				
Јумурталығын	183,0	г	39	1														1		
Простат вәзинин	185	к	40	2													1	1		
Хаја[illegible]	186	к	41	–																
чинси үзвүн	187,1-4	к	42	–																
сидик кисәсинин	188	к	43	2												1		1		
		г	44	–																
бөјрәкләрин	189,0	к	45	–																
		г	46	–																
баш бејнин, әсәб системинин дикәр вә мүә-јән едилмәмиш формалы хәстәликләри	191,192	к	47	2													1	1		
		г	48	3													1	1	1	
галханабәнзәр вә'зин	193	к	49	1																1
		г	50	–																
лимфа вә ганјарадычы тохуманын	200-208	к	51	10												[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		г	52	9								2	2	1	1	[illegible]	[illegible]	4		
Бунлардан лимфосаркома, ретикулосаркома вә лимфоид тохуманын дикәр бәдхассәли шишләри	200,202	к	53	2									1		1					
		г	54	1										1						
лимфогранулематоз	201	к	55	2											1					
		г	56	1												1				
чохлу миелома вә иммунопролиферативи шиш	203	к	57	2											1			1		
		г	58	1																
кәскин лимфолејкоз	204,0	к	59	1												1				
		г	60	1													1			
дикәр лимфолејкозлар (хроники, кәскин габағы)	2041-9	к	61	1												1				
		г	62	1											1					
кәскин миелолејкоз	2050	к	63	1												1				
		г	64	1											1					
дикәр миелолејкоз (хроники кәскин габағы, миелосаркома вә с)	2051-9	к	65	–												–				
		г	66	1												1				
дикәр кәскин лејкозлар(моноситар вә с)	2060, 2070, 2080	к	67	1											1					
		г	68	1												1				
дикәр лејкозлар (хроники,кәскин габағы вә с)	2061-9 2071-8 2081-8	к	69	–																
		г	70	1											1					

Гејдә алынмыш хәстәләрин үмуми сајындан-кәнд әһалиси арасында кишиләр 1 43, гадынлар 2 48

7№ Форма – Сәһифә 3

Figure AI.7. Azeri cancer data form #7: number of new cancer cases by age and sex – part 3 (2000).

"Статистика һаггында" Ганунун 7-чи [illegible] 16-чы маддәләринә көрә бүтүн мүәссисә, идарә вә тәшкилатлар, һабелә физики шәхсләр мүәјјәнләшдирилмиш гајдада [illegible] статистика органларына һесабат вермәјә борчлудурлар, һесабаты тәгдим етмәјән һүгуги вә физики шәхсләр мадди мәс'улијјәтә [illegible] едилирләр, мәс'улијјәтә чәлб етмә онлары һесабат тәгдим етмәкдән азад етмир. Статистика мүшаһидәләринин, һабелә учот ваһидләринин дөвләт рејестринин апарылмасы үчүн зәрури олан мә'луматлары тәгдим етмәмә, јахуд вахтында тәгдим етмәмә вә ја һәмин мә'луматлары тәһрифетмә, бу әмәл ејни һәрәкәтләр үчүн инзибати тәнбеһ едилдикдән сонра ил әрзиндә јенидән төрәдилдикдә вә ја ејни мүддәтә ислаһ ишләри вә ја минимум әмәк һагты мәбләғинин једди јүз мислиндән сәккиз јүз мислинәдәк мигдарда чәримә илә чәзаландырылыр. (Азәрбајҹан Республикасынын Ҹинајәт Мәҹәлләсинин 172 - 2-чи маддәси).

ДӨВЛӘТ СТАТИСТИК ҺЕСАБАТЫ

1	2	3	4	5	6
ИСТ үзрә сәнәд формасынын	ИТТ үзрә сәнәд тәртиб едән тәшкилатын, мүәссисәнин вә с.	ДИОГС үзрә назирлијин (баш идарәнин), бирлијин, ассосиасијанын	ИӘОГС үзрә МР-нын, рајонун шәһәрләрин	Фәалијјәт нөвләри үзрә	МФСТ үзрә мүәссисәнин (тәшкилатын) мүлкијјәт (тәсәррүфатчылыг) формасынын
КОДЛАРЫ					

Кимә тәгдим едилир: Азәрбајҹан Сәһијјә Назирлији

Гәбул едән тәшкилатын ады

Гәбул едән тәшкилатын унваны

Республика: Азәрбајҹан

Рајон: [illegible]

Идарә (мүәссисә)

35 №: форма

БӘД ХАССӘЛИ ЈЕНИТӨРӘМӘЛӘРЛӘ ХӘСТӘЛӘНӘНЛӘР ҺАГГЫНДА ҺЕСАБАТ

Азәрбајҹан Дөвләт Статистика Комитәсинин 30 нојабр 1998-чи ил тарихли 31/5 №-ли гәрары илә тәсдиг едилмишдир

Почтла-иллик

Тәгдим едирләр: Онколожи диспансерләр (диспансер шө'бәләри олан онколожија институтлары), хәстәханалар (бирләшмиш поликлиникалар), онколожи шө'бәләри олан хәстәханалар - рајон (шәһәр) сәһијјә шө'бәсинә, рајонун (шәһәрин) баш һәкиминә јанварын 5-нә кими.

Сәһијјә мүәссисәсинин ады вә нөвү: МРХ

(гејд етмәк: сәһә, рајон, мәркәзи, шәһәр, республика. Тибби санитар һиссәләри үчүн истеһсалын саһәси)

Республика: Азәрбајҹан

Рајон: Сабирабад

Јашајыш мәнтәгәси: Азәрбајҹан проспекти № 101

сәһијјә мүәссисәсинин унваны

« 07 » феврал 1999 -чи ил

Рәһбәр: [illegible]

Ичрачынын вәзифәси, Ады, Сојады вә телефон №-си: [illegible]

Figure AI.8. Azeri cancer data form #35: number of new cancer deaths – part 1 (2000).

Азәрбајҹан Республикасы Сәһијјә Назирлији
Информатика вә Статистика Идарәси
Тел 93 63 92, Факс. 93 76 47

2100. Онколожи идарәдә гејдијјатда олан бәдхассәли шишлә хәстәләнмиш шәхсләрин контингенти											
Шишләрин локализасија	сәтир №-си	IX бахыш ХБТ үзрә шифр	һесабат илиндә гејдә көтүрүлмүшдүр		һәјатында илкин диагноз гојулмуш хәстәләр				һесабат илинин ахырына гејдијјатда оланлар		Онлардан диагноз гојулан андан 5 ил вә јухары мүддәтдә гејдијјатда олан-лардыр
			һәјатында илкин диагноз гојулмуш хәстәләр	о ҹүмләдән профилактики бахыш заманы ашкар олунанлар	диагноз морфоложи олараг тәсдиг едилмишдир	хәстәлик мәрһәләләри вардыр					
						I - II	III	IV	Ҹәми	онлардан гадынлар	
А	Б	В	1	2	3	4	5	6	7	8	9
Бәд хассәли шишләрин - ҹәми	1	140-208	111	36	82	36	68	7	352	227	223
о ҹүмләдән 14 јаш дахил олмагла ушаглар	2	140-208	—	—							
Үмуми сајдан - бәд хассәли шишләр додагларын	3	140	—	—					5	2	5
ағыз бошлуғу вә удлағын	4	141-149	2	1	2	1	1		4	2	2
гида борусунун	5	150	9	3	14	4	5		4	2	3
мә'дәнин	6	151	14	3	13	3	14		17	4	6
чәнбәр бағырсағын	7	153	7	2	7	3	4		6	2	2
дүз бағырсағын, дүз сигмаја бәнзәр ..., анусун	8	154	2	1	2	—	2		2	–	—
гыртлағын	9	161	5	2	2	–	5		14	6	3
трахеја, бронх, ағҹијәрин	10	162	11	6	–	2	9		29	11	6
сүмүк вә бирләшдириҹи тохумаларын	11	170,171	3	1	3	–	3		28	13	20
дәринин меланомасы	12	172	—		—						
дәринин дикәр јени төрәмәләри*)	13	173	—		—				66	58	66
süд вәзисинин	14	174,175	6	4	5		5		42	42	21
ушаглыг бојнунун	15	180	2	1	2		2		30	30	40
ушаглыг ҹисминин	16	182	2	1	2		2		24	29	21
јумурталыгларын	17	183.0	1	–	1		1		23	23	22
простат вәзисинин	18	185	2	1	2		2		2		—
сидик кисәсинин	19	188	2	1	2		2		5		2
галханабәнзәр вәзинин	20	193	1	1	—	1	—		—		—
бәдхассәли лимфомалар	21	200-203	2	2	2	2	—	2	30	12	12
лејкемијалар	22	204-208	15	1	12	8	6	1	40	2	—
дикәрләри	23		18	3	10	10	4	4	5	3	–

*)Ҹинсијјәт үзвләринин дәриси истисна олмагла

35№ Форма - Сәһифә 2

Figure AI.9. Azeri cancer data form #35: number of new cancer deaths – part 2 (2000).

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Тел: 93 63 92; Факс 93 76 47

2210 Онколожи идарәдә гејдијјатда олмајанлардан өләнләрин сајы 1_____

онлардан өлүмдән сонра диагноз гојуланлар 2_____,

о ҹүмләдән мејидин јарылмасы заманы 3_____.

дикәр назирликләрин, мүәссисәләрин мүалиҹә-профилактика идарәләриндә гејдијјатда оланлар 4_____

Бәдхассәли шиши олан хәстәләрдән дикәр хәстәликләрдән өләнләрин сајы 5 11

табеқы гејдијјат илиндә илкин гејдә алынан хәстәләрдә апарылан мүалиҹәнин ағырлашмасындан өләнләр 6 45

2300 Хүсуси мүалиҹәјә еһтијаҹы олан бәдхассәли шишләрин мүалиҹәси барәдә мә'лумат (II клиник груп)

Шишләрин локализасијасы	сәтир №-си	IX бахшы ХБТ үзрә шифр	һесабат илиндә гејдијјата көтүрүлән вә хүсуси мүалиҹәни баша чатдыран хәстәләрин сајы	О ҹүмләдән бу методлардан истифадә етмәклә: анҹаг ҹәррәһијјә	анҹаг шүа	анҹаг дәрман	комбинә олунмуш вә ја комплекс (кимјәви шүал башга)	кимјәви шүаланма
А	Б	В	1	2	3	4	5	6
Бәд хас. шишләрин-ҹәми	1	140-208	111	22	11	25	16	37
о ҹүмләдән 14 јаш дахил олмагла ушаглар	2	140-208						
Үмуми сајдан-бәд хассәли шишләр додагларын	3	140						
ағыз бошлуғу вә удлағын	4	141-149	2		1	1		
гида борусунун	5	150	9		3	2		4
мә'дәнин	6	151	14	6		4	9	
чәнбәр бағырсағын	7	153	8				8	
дүз бағырсағын, дүз вә сигмаји бәнзәр бир-ик, анусун	8	154	2			1		1
гыртлағын	9	161	5					3
трахеја, бронх, ағҹијәрин	10	162	11	6				5
сүмүк вә бирләшдиричи тохумаларын	11	170,171	3	3				
дәринин меланомасы	12	172	–					
дәринин дикәр јени төрәмәләри*)	13	173	–					
суд вәзисинин	14	174,175	6	2	1	1		2
ушаглыг бојнунун	15	180	2		2			
ушаглыг ҹисминин	16	182	2	1		1		
јумурталыгларын	17	183	1					1
простат вәзисинин	18	185	2	2				
сидик кисәсинин	19	188	2					2
галханабәнзәр вәзинин	20	193	1					1
бәдхассәли лимфомалар	21	200-203	4		1	1		2
лејкемијалар	22	204-208	15			4		11
дикәрләри	23		18	2	3	10		3

2310 һәјатында илкин диагноз гојулмуш хәстәләрдән һесабат илиндә мүалиҹәни давам етдирәнләр 1_____,
мүалиҹәдән имтина етмишләр 2_____, о ҹүмләдән хәстәлијин I вә II мәрһәләсиндә 3_____;
мүалиҹәнин апарылмасына әкс кестәриши оланлар 4_____, о ҹүмләдән хәстәлијин I вә II мәрһәләсиндә 5_____.
Хүсуси мүалиҹәни гуртаранлардан - анҹаг амбулатор мүалиҹә аланлар 6_____.
Башга мүалиҹәләрлә әлагәләндирмә нәзәрә алынмагла һесабат илиндә дәрманла мүалиҹәни гуртаран хәстәләрин
үмуми мигдары (гејдә алынан вахты вә хәстәлијин мәрһәләси нәзәрә алынмадан) 7 15,
о ҹүмләдән лимфа, ганјарадыҹы тохуманын бәдхассәли шишләри олан хәстәләр 8 7,
шүа мүалиҹәси аланлар 9_____.

35№ Форма - Сәһифә 3

Figure AI.10. Azeri cancer data form #35: number of new cancer deaths – part 3 (2000).

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2110 һәјатында илк дәфә бәдхассәли шишлә гејдә алынан хәстәләрин (1гр,сәт) үмуми сајындан чохлу илкин шишләри оланлар 1______, онлардан синхрон әмәлә кәләнләр 2________; cr in situ 3______.
о чүмләдән ушаглыг бојнунун 4_________.

2120 Онколожи идарәдә гејдијјатда олан хәстәләрдән (гр 7. Кечән илин һесабаты вә гр. 1. назырки һесабат):
онколожи идарәнин фәалијјәт рајонундан кедәнләр 1__________;
бәд хассәли шиш диагнозу тәсдиг мә'луматы олмајан шәхсләрин сајы 2____________;
ил әрзиндә онколожи идарәнин мә'луматы олмајан хәстәләрин сајы 3____________
Илин ахырына гејдијјатда олан хәстәләрдән (сәт. 1 гр. 7) - кәнд әһалиси 4 23?
Профилактик бахыш заманы һәјатаныда илкин диагноз гојулан хәстәлијин I-II мәрһәләсиндә онлар 5 13,
онлардан визуал көрүнән локализасијалы шиши олан хәстәләр 6 9;
Габаглар бәдхассәли шиш диагнозу мүәјјән едиләнләрдән һесабат илиндә гејдә алынан хәстәләр 7_______.

2200 2. Бәдхассәли шишләрдән өләнләрин мә'луматы

Шишләрин локализасијасы	сәтир №-си	IX бахшы ХБТ үзрә шифр	*һесабат илиндә өләнләрин сајы (гејдијјатда оланлардан)	Кечән илдә илкин гејдә алынан-лардан диагнозу гојуландан 1 илә гәдәр муддәтдә өләнләр**)
А	Б	В	1	2
бәд хассәли шишләрин - чәми	1	140-208	105	60
о чүмләдән 14 јаш дахил олмагла ушаглар	2	140-208	–	–
Үмуми сајдан-бәд хассәли шишләр: додагларын	3	140	–	–
ағыз бошлуғу вә удлағын	4	141-149	–	–
гида борусунун	5	150	10	6
мә'дәнин	6	151	18	12
чәнбәр бағырсағын	7	153	5	3
дүз бағырсағын, дүз вә сигмаја бәнзәр бир-ин, анусун	8	154	2	–
гыртлағын	9	161	5	2
трахеја, бронх, ағчијәрин	10	162	14	8
сүмүк вә бирләшдиричи тохумаларын	11	170,171	3	
дәринин меланомасы	12	172	–	
дәринин дикәр јени төрәмәләри*)	13	173	–	
суд вәзисинин	14	174,175	6	2
ушаглыг бојнунун	15	180	2	1
ушаглыг чисминин	16	182	2	1
јумурталыгларын	17	183	1	1
простат вәзисинин	18	185	2	2
сидик кисәсинин	19	188	2	1
галханабәнзәр вәзинин	20	193	1	1
бәдхассәли лимфомалар	21	200-203	4	3
лејкемијалар	22	204-208	11	8
дикәрләри	23		17	10

*)Чинсијјәт үзвләринин дәриси истисна олмагла
**) һесабат илинде вә ондан әввәлки илдә өләнләр

35№ Форма - Сәһифә 4

Figure AI.11. Azeri cancer data form #35: number of new cancer deaths – part 4 (2000).

26.01.02

DÖVLƏT STATİSTİKA HESABATI

ALINMIŞ İLKİN MƏ'LUMATLARIN MƏXFİLİYİNƏ ZƏMANƏT VERİLİR

Müəssisənin adı Ucar mərkəzi rayon xəstəxanası

Ünvanı Ucar ş. n. D. Bərgud 93

7-saylı forma

Azərbaycan Respublikası
Dövlət Statistika Komitəsinin
04.12.2000-ci il tarixli, 72/5 saylı
qərarı ilə təsdiq edilmişdir.

Müəssisə sənədlərinin təsnifatı üzrə formanın kodu	Müəssisənin identifikasiya (statistik) kodu
0667138	

Poçtla-illik

Təqdim edirlər:
1. Respublika və başqa onkoloji dispanserlər bədxassəli şişlə xəstələnmiş şəxslərin ərazi qeydiyyatını aparan və bu məqsədlə yeni aşkar olunmuş xəstəliklər haqqında mə'lumatı olan yuxarı səhiyyə orqanlarının göstərişi ilə ərazi səhiyyə idarə orqanına, respublika - müəyyən olunmuş müddət ərzində. Ərazi səhiyyə idarə orqanının paytaxt şəhər, respublika üzrə hesabatı Səhiyyə Nazirliyinə müəyyən olunmuş müddət ərzində.
2. Səhiyyə Nazirliyi Dövlət Statistika Komitəsinə

200___-ci il üçün

BƏDXASSƏLİ YENİTÖRƏMƏLƏR VƏ BU XƏSTƏLİKLƏRLƏ XƏSTƏLƏNƏNLƏR HAQQINDA

HESABAT

"22" 01 2002 il Rəhbər

İcraçının vəzifəsi, adı, soyadı və telefon №-si

Figure AI.12. Azeri cancer data form #7: number of new cancer cases by age and sex – part 1 (2002).

Azərbaycan Respublikası Səhiyyə Nazirliyi
İnformatika və Statistika İdarəsi
Tel.: 93 63 92; Faks: 93 76 47

1000	Bədxassəli şişlə xəstələnmiş şəxslərin cinsə, yaşa və şişlərin lokalizasiyasına görə bölünməsi																				
Bədxassəli şişlərin lokalizasiyası	X baxış XBT üzrə şifr	IX baxış XBT üzrə şifr	Cinsi	Sıra sayı	Qeydiyyata alınan xəstələrin ümumi sayı	O cümlədən bu yaşda olan xəstələrdə															
						0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75 və yuxarı
A	B	C	D	E	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Bədxassəli şişlərin Cəmi	C 00-C97	140-208	к	1	13								1	2		2	1		3	1	3
			q	2	9										2		1	1	3	1	1
o cümlədən. Dodaqların	C 00	140	к	3																	
			q	4																	
Ağız boşluğunun	C 01-C08	141-145	к	5																	
			q	6	1													1			
Udlağın	C09-C13	146-148	к	7																	
			q	8																	
Qida borusunun	C15	150	к	9																	
			q	10	1												1				
Mə'dənin	C16	151	к	11	2												1				1
			q	12	1														1		
Çənbər bağırsağın	C18	153	к	13																	
			q	14																	
Düz bağ-ın, düz siqmaya bənzər birləşmənin, anusun	C19	154	к	15																	
			q	16																	
Qaraciyər və qaraciyərdaxili öd axacaqlarının	C22	155	к	17	2									1					1		
			q	18	1														1		
Mə'dəaltı vəzinin	C25	157	к	19																	
			q	20																	
Burun boşluğunun, orta qulağın və əlavə boşluqların	C30-C31	160	к	21																	
			q	22																	
Qırtlağın	C32	161	к	23	1																1
			q	24																	
Traxeya, bronx, ağciyərin	C33-C34	162	к	25	2								1						1		
			q	26	1														1		
Sümük və oynaq qığırdağının	C40-C41	170	к	27																	
			q	28																	
Birləşdirici və başqa toxumaların	C47-C49	171	к	29																	
			q	30																	
Dərinin melanoması	C43	172	к	31																	
			q	32																	
Dərinin digər yeni törəmələri	C44	173	к	33	3											1			1		1
			q	34	1															1	

7 saylı forma – səhifə 2

Figure AI.13. Azeri cancer data form #7: number of new cancer cases by age and sex – part 2 (2002).

Azərbaycan Respublikası Səhiyyə Nazirliyi
İnformatika və Statistika İdarəsi
Tel.: 93 63 92; Faks: 93 76 47

A	B	C	D	E	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Qadın süd vəzisinin	C50	174	q	35	1										1						
Uşaqlıq boynunun	C53	180	q	36	1										1						
Ciftin	C58	181	q	37																	
Uşaqlıq cisminin	C54	182	q	38																	
Yumurtalığın	C56	183.0	q	39																	
Prostat vəzinin	C61	185	k	40	1									1							
Xayanın	C62	186	k	41																	
Cinsi orqanın	C60	187.1-4	k	42																	
Sidik kisəsinin	C67	188	k	43																	
			q	44																	
Böyrəklərin	C64	189.0	k	45																	
			q	46																	
Baş beynin, əsəb sisteminin digər və müəyyən edilməmiş formalı xəstəlikləri	C71-C72	191, 192	k	47																	
			q	48	1																1
Qalxanabənzər vəzin	C73	193	k	49																	
			q	50																	
Limfa və qanyaradıcı toxumanın	C81-C96	200-208	k	51	2											1				1	
			q	52																	
Bunlardan: limfosarkoma, retikulosarkoma və limfoid toxumanın digər bədxassəli şişləri	C82-C8/3	200, 202	k	53	1											1					
			q	54																	
Limfoqranulematoz	C81	201	k	55	1															1	
			q	56																	
Çoxlu mieloma və immunoproliferativ şiş	C90	203	k	57																	
			q	58																	
Kəskin limfoleykoz	C91	204.0	k	59																	
			q	60																	
Digər limfoleykozlar (xroniki, kəskin qabağı)	C 91.1-9	204.1-9	k	61																	
			q	62																	
Kəskin mieloleykoz	C92	205.0	k	63																	
			q	64																	
Digər mieloleykoz (xroniki, kəs-kin qabağı, mielosarkoma	C92.1-9	205.1-9	k	65																	
			q	66																	
Digər kəskin leykozlar (monositor və s)	C93.0 C94.0 C95.0	206.0, 207.0, 208.0	k	67																	
			q	68																	
Digər leykozlar (xroniki, kəskin qabağı və s)	C93.1-9,C94.1-9,C95.1-9	206.1-9 207.1-8 208.1-8	k	69																	
			q	70																	

1001. Qeydə alınmış xəstələrin ümumi sayından - kənd əhalisi arasında: kişilər 1 10, qadınlar 2 7.

7 saylı forma – səhifə 3

Figure AI.14. Azeri cancer data form #7: number of new cancer cases by age and sex – part 3 (2002).

2100. Onkoloji idarədə qeydiyyatda olan bədxassəli şişlə xəstələnmiş şəxslərin kontingenti

Şişlərin lokalizasiyası	S/S	X baxış XBT üzrə şifr	IX baxış XBT üzrə şifr	Hesabat ilində qeydə götürülmüşdür: həyatında ilkin diaqnoz qoyulmuş xəstələr	Hesabat ilində qeydə götürülmüşdür: o cümlədən profilaktiki baxış zamanı aşkar olunanlar	Həyatında ilkin diaqnoz qoyulmuş xəstələr: diaqnoz morfoloji olaraq təsdiq edilmişdir	Həyatında ilkin diaqnoz qoyulmuş xəstələr: xəstəlik mərhələləri vardır: I-II	III	IV	Hesabat ilinin axırına qeydiyyatda olanlar: CƏMİ	onlardan qadınlar	Onlardan diaqnoz qoyulan andan 5 il və yuxarı müddərdə qeydiyyatdadırlar
A	B	C	D	1	2	3	4	5	6	7	8	9
Bədxassəli şişlərin - cəmi	1	C00-C97	140-208	22	3	22	11	8	3	112	57	40
o cümlədən 14 yaş daxil olmaqla uşaqlar	2	C00-C97	140-208									
Ümumi saydan – bədxassəli şişlər: dodaqların	3	C00	140									
ağız boşluğu və udlağın	4	C01-C14	141-149	1		1	1					
qida borusunun	5	C15	150	1		1		1		6	4	1
mə'dənin	6	C16	151	3		3	1	1	1	7	3	
çənbər bağırsağın	7	C18	153							2		
düz bağırsağın, düz və siqmaya bənzər bir-in, anusun	8	C19	154							4	1	
qırtlağın	9	C32	161	1		1	1			7	2	1
traxeya, bronx, ağciyərin	10	C33-C34	162	3	1	3	1	1	1	18	2	2
sümük və birləşdirici toxumaların	11	C40,C41 C47-C49	170,171									
dərinin melanoması	12	C43	172									
dərinin digər yeni törəmələri*	13	C44	173	4	1	4	3	1		17	8	12
süd vəzisinin	14	C50	174, 175	1		1	1			15	15	9
uşaqlıq boynunun	15	C53	180	1		1	1			4	4	2
uşaqlıq cisminin	16	C54	182									
yumurtalıqların	17	C56	183.0							3	3	1
prostat vəzinin	18	C51	185	1		1		1			X	
sidik kisəsinin	19	C67	188									
qalxanabənzər vəzinin	20	C73	193									
bədxassəli limfomalar	21	C81-C83,C90	200-203	2	1	2	1	1		9	5	2
leykemiyalar	22	C91-C96	204-208									
digərləri	23			4		4	1	2	1	20	10	5

*Cinsiyyət üzvlərinin dərisi istisna olmaqla

2110 Həyatında ilk dəfə bədxassəli şişlə qeydə alınan xəstələrin (1qr, sər) ümümi sayından çoxlu ilkin şişləri olanlar

1______, onlardan sinxron əmələ gələnlər 2________; cr irt situ 3_________, o cümlədən uşaqlıq boynunun 4_______.

Figure AI.15. Azeri cancer data form #7: number of new cancer cases by age and sex – part 4 (2002).

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2120 Onkoloji idarədə qeydiyyatda olan xəstələrdən (qr 7. Keçən ilin hesabatı və qr. 1. hazırki hesabat): onkoloji idarənin fəaliyyət rayonundan gedənlər 1________; bədxassəli şiş diaqnozu təsdiq mə'lumatı olmayan şəxslərin sayı 2________; il ərzində onkoloji idarənin mə'lumatı olmayan xəstələrin sayı 3__________. İlin axırına qeydiyyatda olan xəstələrdən (sət. 1 qr. 7) - kənd əhalisi 4________. Profilaktik baxış zamanı həyatanıda ilkin diaqnoz qoyulan xəstəliyin I-II mərhələsində onlar 5______, onlardan vizual görünən lokalizasiyalı şişi olan xəstələr 6__________; Qabaqlar bədxassəli şiş diaqnozu müəyyən edilənlərdən hesabat ilində qeydə alınan xəstələr 7__________.

2200 2. Bədxassəli şişlərdən ölənlərin mə'lumatı

Şişlərin Lokalizasiyası	sətir №-si	X baxşı XBT üzrə şifr	IX baxşı XBT üzrə şifr	Hesabat ilində ölənlərin sayı (qeydiyyatda olanlardan)	Keçən ildə ilkin qeydə alınanlardan diaqnozu qoyulandan I ilə qədər müddərdə ölənlər
A	B	C	D	1	2
Bəd xas. şişlərin-cəmi	1	C00-C97	140-208	16	12
o cümlədən 14 yaş daxil olmaqla uşaqlar	2	C00-C97	140-208		
Ümumi saydan-bədxassəli şişlər: dodaqların	3	C00	140		
ağız boşluğu və udlağın	4	C01-C14	141-149		
qida borusunun	5	C15	150	1	1
mə'dənin	6	C16	151	4	3
çənbər bağırsağın	7	C18	153		
düz bağırsağın, düz və siqmaya bənzər bir-in, anusun	8	C19	154		
Qırtlağın	9	C32	161		
traxeya, bronx, ağciyərin	10	C33-C34	162	3	2
sümük və birləşdirici toxumaların	11	C40,C41,C47-C49	170, 171		
dərinin melanoması	12	C43	172		
dərinin digər yeni törəmələri*	13	C44	173		
süd vəzisinin	14	C50	174, 175		
uşaqlıq boynunun	15	C53	180		
uşaqlıq cisminin	16	C54	182		
yumurtalıqların	17	C56	183		
prostat vəzinin	18	C61	185	1	1
sidik kisəsinin	19	C67	188		
qalxanabənzər vəzinin	20	C73	193		
bədxassəli limfomalar	21	C81-C83,C90	200-203		
leykemiyalar	22	C91-C96	204-208	2	1
digərləri	23			5	4

* Cinsiyyət üzvlərinin dərisi istisna olmaqla

** Hesabat ilində və ondan əvvəlki ildə ölənlər

2210 Onkoloji idarədə qeydiyyatda olmayanlardan ölənlərin sayı 1_______; onlardan ölümdən sonra diaqnoz qoyulanlar 2_________, o cümlədən meyidin yarılması zamanı 3_______; digər nazirliklərin, müəssisələrin müalicə-profilaktika idarələrində qeydiyyatda olanlar 4_______.

Figure AI.16. Azeri cancer data form #7: number of new cancer deaths– part 5 (2002).

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Bədxassəli şişi olan xəstələrdən digər xəstəliklərdən ölənlərin sayı 5________, qabaqkı qeydiyyat ilində ilkin qeydə alınan xəstələrdə aparılan müalicənin ağırlaşmasından ölənlər 6________;

2300 Xüsusi müalicəyə ehtiyacı olan bədxassəli şişlərin müalicəsi barədə mə'lumat (II klinik qrup)

Şişlərin lokalizasiyası	s/s	X baxşı XBT üzrə şifr	IX baxşı XBT üzrə şifr	Hesabat ilində qeydiyyata götürülən və xüsusi müalicəni başa çatdıran xəstələrin sayı	O cümlədən bu metodlardan istifadə etməklə: Ancaq cərrahiyyə	ancaq şüa	ancaq dərman	kombinə olunmuş və ya kompleks (kimyəvi şüal.başqa)	kimyəvi şüalanma
A	B	C	D	1	2	3	4	5	6
Bədxassəli şişlərin-cəmi	1	C00-C97	140-208	9	2	4	2	1	
o cümlədən 14 yaş daxil olmaqla uşaqlar	2	C00-C97	140-208						
Ümumi saydan-bəd xassəli şişlər: dodaqların	3	C00	140						
ağız boşluğu və udlağın	4	C01-C14	141-149	1			1		
qida borusunun	5	C15	150						
mə'dənin	6	C16	151						
çənbər bağırsağın	7	C18	153						
düz bağırsağın, düz və siqmaya bənzər bir-in, anusun	8	C19	154						
qırtlağın	9	C32	161	1			1		
traxeya, bronx, ağciyərin	10	C33-C34	162						
sümük və birləşdirici toxumaların	11	C40,C41,C47-C49	170,171						
dərinin melanoması	12	C43	172						
dərinin digər yeni törəmələri*	13	C44	173	3		3			
süd vəzisinin	14	C50	174,175	1	1				
uşaqlıq boynunun	15	C53	180	1	1				
uşaqlıq cisminin	16	C54	182						
yumurtalıqların	17	C56	183						
prostat vəzisinin	18	C51	185						
sidik kisəsinin	19	C67	188						
qalxanabənzər vəzinin	20	C73	193						
bədxassəli limfomalar	21	C81-C83,C90	200-203	1		1			
leykemiyalar	22	C91-C96	204-208						
digərləri	23			1				1	

2310 Həyatında ilkin diaqnoz qoyulmuş xəstələrdən hesabat ilində müalicəni davam etdirənlər 1________, müalicədən imtina etmişlər 2________, o cümlədən xəstəliyin I və II mərhələsində 3________; müalicənin aparılmasına əks göstərişi olanlar 4________, o cümlədən xəstəliyin I və II mərhələsində 5________. Xüsusi müalicəni qurtaranlardan - ancaq ambulator müalicə alanlar 6________. Başqa müalicələrlə əlaqələndirmə nəzərə alınmaqla hesabat ilində dərmanla müalicəni qurtaran xəstələrin ümumi miqdarı (qeydə alınan vaxtı və xəstəliyin mərhələsi nəzərə alınmadan) 7________, o cümlədən limfa, qanyaradıcı toxumanın bədxassəli şişləri olan xəstələr 8________; şüa müalicəsi alanlar 9________.

Figure AI.17. Azeri cancer data form #7: number of new cancer deaths– part 6 (2002).

Appendix II: Lifestyle Survey Questionnaires

English Version

Information Letter (For Lifestyle Survey)

Dear Participant,

We are conducting a study on the health effects of long-term pollution in Sumgayit, in conjunction with the United Nations Development Programme's Environmental Rehabilitation of Sumgayit Project. We would like to ask you a few questions about your day-to-day life that will be helpful in allowing us to understand more about the residents of this city. Your name will not be collected; all information will be kept confidential, and only used as part of the above research. There are no risks associated with your participation in this research. Are you willing to answer a few questions that will take no more than about 3-4 minutes of your time?

If you have any further questions or concerns about your participation in the study, please feel free to contact us at the Sumgayit Centre for Environmental Rehabilitation.

16 Nizami Street, Sumgayit, Azerbaijan
Telephone: (994164) 22612
Email: sum@sec.sumqait.az

Thank you for your time.

Ministry of Health and State Committee of Statistics of the Azerbaijan Republic,
UNDP center for Environment Rehabilitation in Sumgait city,
University of Alberta (Canada)

LIFESTYLE QUESTIONNAIRE

(To be filled by people in the age range from 18 and over)

A. Polling area:

City

Address: ______________________________

District, town, village

Street and number ______________________ № apartment [ ]

B. Personal information:

1. Sex; M. - 1 F. - 2 [ ] 2. Age [ ] Years

3. Duration of residing in given city [ ] Years

a) In case of change of residence, indicate last two area, and also terms of residence in area

Address	Number of years

4. Profession In case of change of profession indicate previous two and occupation time record each of them

Profession	Seniority (year)

V. The tobacco consumption:

5. Do you smoke? Yes - 1 No - 2 [ ]

If "Yes" Specify,:

a) For how many years do you smoke? [ ] Years

б) How many cigarettes per day? [ ] Pieces

If "No", Specify;

6. Whether you smoked earlier? Yes - 1 No - 2 [ ]

a) If "Yes", Specify

6.1 At what age have you started to smoke? [ ] Year

6.2. How many cigarettes per day? [ ] Pieces

6.3. How many years you smoke? [ ] Years

6.4. When did you quit smoking? [ ] Year

Q. The alcohol consumption:

7. Quantity of alcohol consumption within a week

	Gram	At what age have you started to use alcohol? (Age)
7.1. Beer		
7.2. Vine		
7.3. Brandy		
7-4. Vodka		
7.5. Other (Specify)		

D. Nutrition:

8. Sources of drinking water

Indicate concrete sources and duration of consumable water from each.

	From (year)	Till (Year)
8.1. Urban water line		
8.2. Blow well		
8.3. Well in a court yard		
8.4. Pushdown water in plastic bottles		
8.5. Other (Specify)		

9. Food ration

	How many times per week
9.1 Mutton	
9.2. Beef	
9.3. Fish	
9.4. Chicken	
9.5. Pork	
9.6. Potherbs and vegetables	
9-7. Fresh fruit	

E. Oncology anamnesis of family:

10- whether someone in your family suffered from oncology diseases?

Yes - 1, No - 2 , to be unaware - 3

10.1. Father	
10.2-Mother	
10.3- Brother	

10,4, Sister	
10.5. Son, daughter	
10.6. Other relatives	

THANK FOR COLLABORATION

The examination is carried out in the season from July 23 till July 27, 2001 by specially trained recorders in cities Ganja, Sumgait, Lenkoran and Astara by polling of the population, with scope, approximately, 900-950 persons.

The questionnaire of examination is filled by an adult member in the age of 18 years and over of the household involved in sampling.

Item the indications for filling the questionnaire:

1 question - Either figure "1" or "2" is chosen depending on the sex of the person fillings questionnaire;

2 question - One indicates the exact number of years of the person fillings questionnaire;

3 question - The number of years of residence in the given city is indicated/ in case of change of place of residence within the city last two addresses are indicated along with the dates of residence;

4 and 5 questions - Figures corresponding to questions listed on the left are indicated

6 question - The exact quantity of indicated alcohol drinks as used per week by the respondent is described along with the number of years

7 question - A respondent indicates both the year from which and up to which the described source of drinking water was used

8 question - The approximate number of times per week that the products mentioned appear in the respondent's ration is indicated (for the first half of the year 2001)

9 question - The code for one of the given hints is listed: yes –1; No –2;

For question's 6, 7 and 8 one can use several hint versions.

Russian Version

Уважаемый Участник,

Благодарим за Ваш интерес к исследованию по заболеваемости раком и смертности от раковых заболеваний в Сумгаите. Данный проект представляет собой совместные усилия с Проектом по Реабилитации окружающей среды Сумгаита (Программы Развития ООН). Предоставленная Вами информация представляет огромную ценность для оценки влияния длительного загрязнения на уровень заболеваемости раком в городе Сумгаит. Полученная от Вас информация будет использована для выявления источников раковых заболеваний на рабочих местах и в городе в целом. Мы бы хотели предложить Вам несколько вопросов, затрагивающих темы трудовой деятельности и образа жизни. В результате этого мы надеемся определить характер конкретных внешних воздействий, вызывающих возникновение раковых заболеваний. Используя эту информацию, мы надеемся выработать способы ограничения вредных (вызывающих рак) воздействий и предложить стратегию для снижения заболеваемости раком в Сумгаите в будущем. Хотя нами запрашивается большое количество подробных данных личного характера, вся собранная информация будет пользоваться строжайшей конфиденциальностью, и будет использоваться лишь в вышеуказанных целях. В случае возникновения у Вас дополнительных вопросов по поводу вашего участия в исследовании прошу Вас обращаться к нам в Сумгаитский Центр по Реабилитации окружающей среды.

Адрес: Сумгаит, ул. Низами, 16
Телефон: (994164)22614
Эл. почта: sum@sec.sumqait.az

Благодарим за уделенное Вами время.

Министерство Здравоохранения Азербайджанской Республики
Проект «Экологическая Реабилитация Сумгаита», Программа Развития ООН
Университет АЛЬБЕРТЫ (Канада)

ВОПРОСНИК
для изучения влияния на здоровье населения факторов окружающей среды
(для лиц старше 18 лет)

(нижеследующая информация может быть представлена в сжатой форме в целях выражения исключительно сущности опроса).

Название города: Сумгаит
Микрорайон/квартал________ вопросник №____________ студент___________

А. Образ жизни

Личная информация:
1.Пол *М / Ж*
2.Год рождения _________
3. Сколько лет Вы проживаете в этом городе? ______
а. В какой части города Вы проживаете, и в течение какого срока?
В случае перемены места жительства приведите сроки проживания в каждом.

4.Ваша профессия _________________
В случае смены профессии укажите предыдущие и трудовой стаж по каждой профессии.

Употребление табака:
4. Курите ли Вы? Да / Нет
Если *"Да"*, то:
i. Какое количество сигарет в день? ______
ii. На протяжении скольких лет Вы курите? ______
Если "*Нет* ", то:
i. Курили ли Вы раньше? Да / Нет
ii. Если "*Да*", то:

4.1.	В каком возрасте Вы начали курить?	
4.2.	Какое количество сигарет в день?	
4.3.	На протяжении скольких лет Вы курили?	
4.4.	В каком году Вы отказались от курения?	

Употребление алкоголя:

5. Какое количество алкогольных напитков Вы употребляете в течение недели?

		миллилитров	At approximately what age did you start?
5.1.	*Пиво*		
5.2.	*Вино*		
5.3.	*Коньяк*		
5.4.	*Водка*		
5.5.	*Другое (укажите)*		

Рацион:

6. Опишите Ваш источник получения питьевой воды.

Укажите конкретные источники и длительность использования воды из каждого.

		с 19 ……. по 19……..
6.1.	*Городской водопровод*	
6.2.	*Артезианская скважина*	
6.3.	*Колодец во дворе*	
6.4.	*Магазинная вода в пластиковых бутылках*	
6.5.	*Другое (укажите)*	

7. Old: Как часто и в каком количестве в Вашем рационе появляются следующие продукты? (New: In a typical week, how many servings of each of the following foods do you consume):

		количество
7.1.	Баранина	
7.2.	Говядина	
7.3.	Рыба	
7.4.	Курица	
7.5.	Свинина	
7.6.	Зелень	
7.7.	Свежие фрукты	

История заболевания раковыми заболеваниями в семье

8. Страдал ли кто-либо в Вашей семье раковыми заболеваниями?:

		Да	*Нет*	*Не знаю*
8.1.	Мать			
8.2.	Отец			
8.3.	Брат			
8.4.	Сестра			
8.5.	Ребенок			
8.6.	Другие родственники			

Azeri Version

Щюрмятли Иштиракчы,

Сумгайыт шящяри цзря кечирилян хярчянэ хястялийи вя бу хястялик нятиъясиндя юлцм щалларынын тядгиги мясялялäриня эюстярдийиниз мараг цчцн Сизя юз миннятдарлыьымызы билдиририк. Бу лайищя Азярбайъан Республикасы Сящиййя Назирлийи, Канаданын Алберта Университети вя Бирляшмиш Миллятляр Тяшкилаты Инкишаф Програмы «Сумгайытын Еколожи Реабилитасийасы» лайищясинин бирэя ся'йи нятиъясиндя щазырланмышдыр. Сизин тягдим едяъяйиниз мя'луматлар Сумгайыт шящяри цзря хярчянэ иля хястялянмя щалларына ятраф мцщитин узунмцддятли чирклянмяси просесинин тя'сиринин гиймятляндирилмясиндя мцщцм ящямиййят кясб едир. Бу мя'луматлардан иш йерляриндя вя бцтцнлцкля шящяр цзря хярчянэ хястялийи мянбяляринин ашкар едилмяси мягсяди иля истифадя едиляъякдир. Бу мягсядля биз Сизя ямяк фяалиййяти вя щяйат тярзи мювзуларыны ящатя едян бир нечя суалла мцраъият етмяк истярдик. Бурада мягсяд конкрет хариъи тя'сирлярин хярчянэ хястялийинин ямяля эялмясиндяки ролуну мцяййян етмяк, беля тя'сирлярин мящдудлашдырылмасы йолларыны ахтарыб тапмаг вя эяляъякдя Сумгайыт шящяри цзря хярчянэ хястялийи иля хястялянмя щалларынын ашаьы салынмасы цчцн стратеэийаны щазырламагдыр. Бизим суалларын бюйцк яксяриййятинин шяхси характер дашымасына бахмайараг верилян ъаваблар ъидди мяхфилик шяраитиндя йалныз йухарыда ады чякилян мягсядляр цчцн истифадя едиляъякдир. Сиздян тядгигатда иштирак етмяйиниз щаггында мейдана чыха биляъяк щяр щансы бир суалла «Сумгайытын Еколожи Реабилитасийасы» лайищясиня мцраъият етмяйинизи хащиш едирик.

Цнван: Сумгайыт, Низами кцч.,16

Телефон: (+994164) 2 26 14

Електрон почт: sum@sec.sumgait.az

Бизя айырдыьыныз вахт цчцн Сизя юз миннятдарлыьымызы билдиририк.

Азярбайъан Республикасы Сящиййя Назирлийи
БМТ Инкишаф Програмынын « Сумгайытын Еколожи Реабилитасийасы» лайищяси
АЛБЕРТА Университети (Канада)

СОРЬУ ВЯРЯГЯСИ
ятраф мцщит факторларынын ящалинин саьламлыьына тя'сиринин юйрянилмяси цчцн (18 йашындан йухары оланлар цчцн)

Шящярин ады: Сумгайыт

Микрорайон/мящялля: ______ сорьу #__________ тялябя_____________

А. Щяйат тярзи

Шяхси мя'лумат
1.Ъинси *К / Г*
2.Доьулма тарихи __________
3. Нечя илдир бу шящярдя йашайырсыныз? ______
а. Шящярин щансы щиссясиндя йашайырсыныз, вя щансы мцддятдир?
Йашайыш йерини дяйишмисинизся, щяр бир яразидя йашадыьыныз мцддяти эюстярин

4.Сянятиниз __________________
Сянятинизи дяйишдирдийиниз щалда, яввялки сянятинизи вя бу сянятля ишлядийиниз мцддяти эюстярин.

Тцтцнцн истифадяси:
4. Сиз сигарет чякирсинизми? Щя / Йох
Яэяр «Щя»:
i. Эцн ярзиндя чякдийиниз сигаретин сайы? ______
ii. Нечя ил мцддятиндя Сиз сигарет чякирсиниз? ______
Яэяр «Йох»:
i. Сиз яввял сигарет чякмисинизми? Щя / Йох
ii. Яэяр «Щя»:

4.1.	Нечя йашдан сигарет чякмяйя башламысыныз?	
4.2.	Эцн ярзиндя чякдийиниз сигаретин сайы?	
4.3.	Нечя ил мцддятиндя Сиз сигарет чякмисиниз?	
4.4.	Сигарет чякмякдян имтина етдийиниз вахт?	

Спиртки ичкилярин гя'булу:

5. Щяфтя ярзиндя ичдийиниз спиртки ичкилярин мигдары?

		Миллилитр	At approximately what age did you start?
5.1.	*Пивя*		
5.2.	*Чахыр*		
5.3.	*Конйак*		
5.4.	*Араг*		
5.5.	*Башга (адыны гейд един)*		

Эцндялик расион

6. Истифадя етдийиниз су мянбяйини гейд един

Конкрет су мянбялярини вя онлардан истифадя мцддятини гейд един

		19 ...илдян 19... иля гядяр
6.1.	*Шящяр су тяъщизаты*	
6.2.	*Артезиан гуйусу*	
6.3.	*Щяйятдяки гуйудан*	
6.4.	*Магазадан алынан пластик габлардакы су*	
6.5.	*Диэяр (адыны гейд един)*	

7. Ашаьыдакы гейд олунан мящсулларын сизин расионда олмасынын мигдарыны вя тезлийини эюстярин : (New: In a typical week, how many servings of each of the following foods do you personally consume?)

		Мигдары
7.1.	Гойун яти	
7.2.	Мал яти	
7.3.	Балыг	
7.4.	Тойуг	
7.5.	Донуз яти	
7.6.	Эюйярти	
7.7.	Тязя мейвяляр	

Аилядя хярчянэ хястялийинин тарихи

8. Сизин аиляниздя хярчянэ хястялийиня тутулан адам вармы?

		Щя	Йох	Билмирям
8.1.	Ана			
8.2.	Ата			
8.3.	Гардаш			
8.4.	Баьы			
8.5.	Ушаг			
8.6.	Диэярляри (гейд един)			

Appendix III: Cancer Incidence and Mortality Rates

List of Tables in Appendix III

Table AIII.1. Number of cancer cases and crude cancer incidence rates per 100,000 population at selected cancer sites for selected regions of Azerbaijan, both sexes combined (1980-1988).

Site	*Year*	*Azerbaijan*		*Sumgayit*		*Ganja*		*Lenkoran-Astara*		*Lenkoran*		*Astara*	
		N	CR	N	CR	CR	N	N	CR	N	CR	N	CR
All Sites	1980	5918	94.7	212	97.5	-	-	-	-	-	-	-	-
ICD-9:	1981	5927	93.3	227	100.8	100.2	250	171	80.2	134	89.3	37	58.6
140-208	1982	6181	95.8	248	107.3	109.5	277	168	77.2	142	92.8	26	40.3
	1983	6150	93.8	236	100.0	89.5	229	-	-	121	77.3	-	-
	1984	6226	93.5	231	95.5	-	-	-	-	-	-	-	-
	1985	6470	95.8	224	91.0	109.1	289	-	-	-	-	-	-
	1986	7765	113.2	242	95.4	105.8	285	-	-	128	78.1	-	-
	1987	8277	118.7	286	111.1	106.8	293	-	-	118	71.3	-	-
	1988	8433	119.4	287	113.0	94.5	265	-	-	-	-	-	-
Larynx	1980	194	3.1	6	2.8	-	-	-	-	-	-	-	-
ICD-9:	1981	203	3.2	6	2.7	2.4	6	2	0.9	2	1.3	0	0.0
161	1982	192	3.0	9	3.9	4.0	10	9	4.1	8	5.2	1	1.6
	1983	207	3.2	7	3.0	3.5	9	-	-	2	1.3	-	-
	1984	188	2.8	2	0.8	-	-	-	-	-	-	-	-
	1985	207	3.1	8	3.3	2.3	6	-	-	-	-	-	-
	1986	236	3.4	6	2.4	4.8	13	-	-	1	0.6	-	-
	1987	228	3.3	7	2.7	3.7	10	-	-	3	1.8	-	-
	1988	215	3.0	5	2.0	3.6	10	-	-	-	-	-	-
Trachea,	1980	700	11.2	22	10.1	-	-	-	-	-	-	-	-
bronchus,	1981	778	12.3	21	9.3	13.2	33	9	4.2	6	4.0	3	4.8
& lung	1982	734	11.4	36	15.6	15.4	39	13	6.0	13	8.5	0	0.0
ICD-9:	1983	777	11.9	23	9.8	5.5	14	-	-	8	5.1	-	-
162	1984	733	11.0	29	12.0	-	-	-	-	-	-	-	-
	1985	839	12.4	39	15.9	13.6	36	-	-	-	-	-	-
	1986	894	13.0	31	12.2	11.9	32	-	-	18	11.0	-	-
	1987	1009	14.5	33	12.8	20.1	55	-	-	15	9.1	-	-
	1988	957	13.6	38	15.0	11.4	32	-	-	-	-	-	-
Female	1980	433	13.5	22	19.7	-	-	-	-	-	-	-	-
Breast	1981	463	14.2	24	20.8	22.6	29	10	9.1	7	9.1	3	9.3
ICD-9:	1982	514	15.5	13	11.0	27.8	36	6	5.4	4	5.1	2	6.1
174	1983	537	16.0	24	19.8	16.0	21	-	-	2	2.5	-	-
	1984	550	16.1	14	11.3	-	-	-	-	-	-	-	-
	1985	602	17.4	22	17.4	29.4	40	-	-	-	-	-	-
	1986	667	19.0	16	12.3	19.6	27	-	-	5	6.0	-	-
	1987	701	19.6	24	18.2	27.7	39	-	-	5	5.9	-	-
	1988	723	20.0	25	19.2	23.0	33	-	-	-	-	-	-
Urinary	1980	203	3.3	8	3.7	-	-	-	-	-	-	-	-
Bladder	1981	191	3.0	13	5.8	0.4	1	3	1.4	3	2.0	0	0.0
ICD-9:	1982	160	2.5	10	4.3	2.4	6	3	1.4	2	1.3	1	1.6
188	1983	214	3.3	14	5.9	4.3	11	-	-	3	1.9	-	-
	1984	190	2.9	12	5.0	-	-	-	-	-	-	-	-
	1985	229	3.4	9	3.7	2.6	7	-	-	-	-	-	-
	1986	204	3.0	3	1.2	1.5	4	-	-	1	0.6	-	-
	1987	190	2.7	11	4.3	1.8	5	-	-	0	0.0	-	-
	1988	191	2.7	5	2.0	2.5	7	-	-	-	-	-	-

Table AIII.2. Annual cancer incidence per 100,000 population by sex and age group, all cancer sites combined (ICD-9: 140-208), Azerbaijan.

Year	*Cases*	*0-*	*5-*	*10-*	*15-*	*20-*	*25-*	*30-*	*35-*	*40-*	*45-*	*50-*	*55-*	*60-*	*65-*	*70-*	*75+*	*CR*	*ASR (AZE)*	*ASR (W)*
Males																				
1989	4834	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	139.0	-	-
1990	4698	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	134.1	-	-
1991	4173	4.0	7.6	7.6	8.7	18.2	27.9	43.3	71.6	119.2	323.3	295.1	495.4	687.4	1165.4	1418.8	641.4	117.5	133.0	178.1
1992	3415	1.8	6.3	6.7	11.8	16.3	12.8	33.3	58.0	97.9	235.8	263.1	445.4	583.3	732.3	945.6	552.4	94.6	104.9	136.6
1993	2825	1.3	2.3	2.6	2.7	10.8	17.6	26.8	50.6	76.2	204.3	260.6	297.0	415.3	698.1	879.7	361.8	76.9	83.8	111.9
1994	2898	1.2	5.2	3.5	4.1	9.3	13.6	27.8	37.7	86.9	219.9	313.7	301.3	420.7	524.1	912.4	413.7	77.7	84.9	112.3
1995	3238	2.8	3.3	3.4	2.3	9.7	17.9	24.4	40.1	80.4	189.6	314.6	322.5	472.8	669.4	1062.5	569.1	85.7	93.8	123.7
1996	2931	2.9	3.3	4.3	6.4	10.1	14.3	16.1	26.9	39.8	122.7	255.6	277.7	487.5	673.5	958.8	577.1	76.6	84.1	110.2
1997	2741	1.3	3.3	4.5	5.5	5.4	8.8	14.9	35.5	55.3	117.3	305.4	266.9	429.7	571.3	861.8	375.8	70.9	77.0	100.9
1998	2447	3.6	2.8	3.6	4.3	8.7	12.8	15.0	35.2	42.0	113.2	222.1	279.3	365.3	519.7	571.1	371.5	63.0	67.5	86.8
1999	2343	1.4	4.9	4.1	9.0	5.7	9.1	14.4	29.1	41.2	98.1	210.9	367.7	333.3	415.4	508.2	406.9	60.1	66.5	83.3
2000	2373	2.4	3.7	6.3	6.4	7.9	8.9	16.2	28.5	49.2	103.7	163.0	317.5	329.1	379.3	619.0	411.1	60.3	63.6	81.0
Females																				
1989	4151	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	113.9	-	-
1990	4636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	126.2	-	-
1991	3581	2.6	4.3	5.7	4.6	10.2	17.7	39.1	80.2	163.1	381.2	319.0	401.8	431.3	500.6	410.0	147.6	96.3	90.6	119.2
1992	3070	1.7	6.4	5.9	4.3	7.2	18.1	47.0	79.0	139.0	222.6	219.2	290.3	312.5	368.4	486.1	303.1	81.4	74.6	94.9
1993	2403	1.2	1.9	2.7	2.7	13.8	17.0	20.2	42.9	82.1	147.5	191.5	218.1	309.1	384.0	385.9	141.5	62.9	56.9	73.6
1994	2381	1.7	3.6	1.8	6.0	6.5	12.3	23.0	55.7	96.3	188.1	203.6	231.2	245.2	333.5	297.3	109.3	61.6	55.5	71.9
1995	2985	2.3	2.8	1.8	3.5	10.1	10.6	33.8	57.2	99.8	225.8	321.3	246.0	304.9	372.5	471.3	197.3	76.4	69.7	90.3
1996	2567	2.4	3.7	2.5	3.2	10.1	10.8	20.5	34.3	64.4	141.2	246.0	216.2	331.4	412.4	419.4	136.6	65.2	58.8	76.2
1997	2512	3.0	4.2	3.7	3.1	5.2	12.7	24.0	40.1	72.9	167.6	275.0	183.5	315.5	327.8	352.8	141.5	63.2	57.9	74.5
1998	2391	2.5	2.5	2.8	2.2	5.9	11.7	21.1	34.7	66.9	117.5	225.1	229.4	287.4	358.6	339.2	149.4	59.3	54.5	69.3
1999	2315	2.5	3.4	5.6	6.0	4.4	7.3	19.0	37.2	74.5	127.3	222.6	251.3	229.6	308.4	336.1	136.1	56.7	52.8	67.2
2000	2431	1.7	5.6	5.3	2.0	1.5	8.9	22.4	40.9	73.9	133.5	198.0	231.5	203.3	313.8	352.8	253.3	59.1	52.9	67.3

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)
ASR (W) = Age-standardized rate (World Standard Population)

Table AIII.3. Annual cancer incidence per 100,000 population by sex and age group, all cancer sites combined (ICD-9: 140-208), Sumgayit.

Year	*Cases*	*0-*	*5-*	*10-*	*15-*	*20-*	*25-*	*30-*	*35-*	*40-*	*45-*	*50-*	*55-*	*60-*	*65-*	*70-*	*75+*	*CR*	*ASR (AZE)*	*ASR (W)*
Males																				
1989	181	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	144.5	-	-
1990	185	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	146.1	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	170	0.0	25.7	0.0	48.6	54.2	8.6	51.8	70.3	184.5	191.5	171.6	723.2	694.6	1172.9	412.4	1151.8	129.4	142.5	173.6
1993	182	0.0	0.0	0.0	0.0	46.9	34.6	50.8	97.9	255.3	599.5	413.1	552.8	396.7	904.0	1703.1	841.5	136.5	149.0	203.4
1994	182	0.0	0.0	6.9	24.1	56.4	60.0	84.6	91.1	197.2	420.8	439.4	341.2	423.6	555.4	1020.6	2334.1	135.1	159.9	196.1
1995	148	0.0	0.0	0.0	0.0	16.4	25.4	8.5	0.0	147.5	69.8	452.1	305.0	610.1	1090.6	1819.3	963.0	109.1	123.5	164.5
1996	165	0.0	6.1	0.0	0.0	8.3	16.6	67.9	38.0	58.5	149.9	338.6	344.8	696.0	1243.7	1780.7	1103.8	120.5	132.3	175.0
1997	108	0.0	0.0	0.0	15.4	0.0	73.4	68.0	55.2	134.6	158.1	506.5	288.6	114.7	307.9	209.0	1102.9	78.2	95.4	109.1
1998	141	7.3	0.0	6.3	22.5	17.3	8.7	34.3	69.7	43.5	198.9	343.3	456.7	600.8	854.7	662.9	703.1	101.6	109.8	138.8
1999	128	7.8	35.9	18.1	21.5	8.8	9.5	8.8	8.3	52.0	144.5	326.5	488.8	568.3	659.5	714.0	561.8	91.9	100.9	126.3
2000	159	0.0	0.0	5.9	27.6	17.1	0.0	17.9	75.9	96.9	165.5	235.2	612.6	819.9	683.9	1005.9	815.4	113.7	120.0	151.8
Females																				
1989	137	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	104.3	-	-
1990	215	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	162.0	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	151	0.0	20.3	7.7	8.4	16.5	15.0	87.2	109.6	232.3	236.3	119.1	460.8	476.9	287.3	368.1	712.9	110.0	99.8	119.6
1993	137	0.0	0.0	0.0	0.0	8.6	54.6	69.4	173.2	133.8	184.6	408.5	307.9	422.5	322.2	496.6	143.3	99.4	92.2	110.8
1994	150	0.0	13.2	0.0	16.6	8.9	56.7	53.6	47.3	199.3	362.2	397.7	294.4	365.9	354.1	701.5	461.2	107.4	97.7	126.2
1995	135	0.0	0.0	0.0	16.5	18.1	0.0	0.0	0.0	70.3	105.8	567.2	314.3	613.7	718.0	811.6	115.6	96.2	91.4	119.1
1996	126	0.0	0.0	0.0	0.0	0.0	16.7	15.3	62.0	100.5	117.7	335.2	300.3	487.2	673.1	655.7	144.5	89.4	79.4	103.5
1997	118	0.0	0.0	0.0	16.0	36.4	42.3	83.8	85.7	160.9	328.4	334.5	167.7	140.7	276.3	0.0	404.4	83.1	76.6	92.7
1998	125	23.7	0.0	13.2	0.0	0.0	33.7	61.3	105.2	83.1	237.2	370.2	278.9	305.4	306.1	366.3	284.8	86.7	81.8	100.0
1999	126	0.0	12.7	6.3	22.0	8.3	17.0	47.0	76.6	118.6	182.8	201.1	319.8	456.6	406.3	466.7	138.6	86.4	77.1	96.7
2000	169	9.4	6.6	12.5	7.1	0.0	17.4	23.9	122.9	192.4	298.9	284.0	377.7	550.2	375.2	464.3	608.1	115.7	100.7	127.2

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)
ASR (W) = Age-standardized rate (World Standard Population)

Table AIII.4. Annual cancer incidence per 100,000 population by sex and age group, all cancer sites combined (ICD-9: 140-208), Ganja.

Year	*Cases*	*0-*	*5-*	*10-*	*15-*	*20-*	*25-*	*30-*	*35-*	*40-*	*45-*	*50-*	*55-*	*60-*	*65-*	*70-*	*75+*	*CR*	*ASR (AZE)*	*ASR (W)*
Males																				
1989	162	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	117.7	-	-
1990	120	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	86.0	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	154	0.0	0.0	13.5	7.5	7.1	31.7	55.7	86.4	127.5	294.1	298.9	486.5	596.1	790.1	855.2	812.0	108.0	120.5	154.1
1993	126	0.0	0.0	6.6	15.0	14.5	16.0	47.1	20.2	39.4	185.2	322.4	388.7	583.9	619.3	701.5	715.2	87.6	98.4	123.8
1994	99	0.0	0.0	12.9	7.5	29.9	23.8	23.5	37.5	73.1	137.6	359.2	421.4	174.4	450.2	157.6	473.0	68.1	76.0	90.3
1995	106	12.2	0.0	6.3	7.4	0.0	15.7	7.9	72.8	68.4	129.4	262.1	247.6	609.6	398.6	220.2	755.5	72.5	81.8	99.5
1996	105	6.4	0.0	6.3	21.9	15.5	23.3	0.0	53.2	65.5	99.9	258.6	250.3	389.8	476.3	692.6	756.0	71.6	80.9	101.3
1997	107	0.0	0.0	18.6	28.9	0.0	7.7	8.0	25.9	94.9	111.5	254.0	343.7	345.1	665.9	655.1	276.4	72.8	75.4	98.2
1998	100	6.9	0.0	0.0	14.2	16.4	33.0	24.3	41.2	71.9	222.2	147.5	172.7	294.6	577.3	569.8	443.1	68.1	68.6	91.3
1999	118	0.0	0.0	17.1	0.0	8.4	9.0	8.3	55.3	49.3	167.6	284.0	521.7	435.5	483.5	774.2	456.6	80.4	87.4	111.4
2000	134	16.0	0.0	17.0	13.1	8.1	0.0	17.0	48.1	83.0	100.1	223.7	342.7	442.6	593.9	1130.7	987.3	91.1	96.2	122.9
Females																				
1989	139	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	96.3	-	-
1990	158	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	108.1	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	130	6.0	12.5	7.1	23.4	22.9	13.9	14.6	30.3	66.9	163.4	313.6	326.8	554.3	470.9	436.2	210.3	87.3	81.4	102.1
1993	123	6.1	0.0	7.0	15.6	8.0	50.6	50.1	66.1	62.0	220.0	162.3	380.5	391.6	380.1	368.2	185.9	82.1	74.8	92.8
1994	101	6.3	12.2	0.0	0.0	0.0	0.0	42.6	96.4	103.9	83.9	216.7	231.1	357.8	328.0	259.9	133.5	67.0	60.8	73.7
1995	137	6.5	12.1	6.7	7.6	8.4	15.3	49.6	67.9	141.4	216.0	215.3	291.6	379.6	468.8	334.7	402.4	90.6	79.8	100.1
1996	111	0.0	0.0	6.6	0.0	8.5	7.8	42.8	33.1	135.5	109.9	260.8	155.7	398.0	290.0	530.5	350.8	73.5	65.7	82.7
1997	155	0.0	6.1	13.1	7.5	0.0	8.0	21.5	104.7	232.0	205.8	257.3	378.5	321.3	448.8	597.3	407.4	103.3	87.0	111.4
1998	119	0.0	0.0	6.3	7.3	24.6	15.9	58.0	22.9	166.9	80.1	188.5	226.0	342.9	458.3	461.8	299.2	78.1	69.1	85.3
1999	139	24.5	0.0	6.0	20.9	7.9	8.1	14.9	65.4	121.9	245.6	381.5	278.2	259.9	433.7	553.4	460.2	90.4	83.5	107.4
2000	142	0.0	6.3	0.0	6.8	0.0	24.8	45.5	87.6	148.1	162.4	228.6	299.4	401.2	333.1	611.4	449.9	92.4	80.5	100.5

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)
ASR (W) = Age-standardized rate (World Standard Population)

Table AIII.5. Annual cancer incidence per 100,000 population by sex and age group, all cancer sites combined (ICD-9: 140-208), Lenkoran-Astara.

Year	*Cases*	*0-*	*5-*	*10-*	*15-*	*20-*	*25-*	*30-*	*35-*	*40-*	*45-*	*50-*	*55-*	*60-*	*65-*	*70-*	*75+*	*CR*	*ASR (AZE)*	*ASR (W)*
Males																				
1989	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1990	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	101	0.0	0.0	0.0	16.6	34.2	0.0	8.8	40.8	51.2	193.7	205.9	297.7	513.1	481.7	988.2	693.9	77.5	85.7	112.7
1996	104	0.0	0.0	0.0	8.1	8.6	25.8	17.6	59.1	60.7	311.1	255.5	218.6	433.4	595.6	769.9	534.8	78.8	83.5	113.2
1997	121	0.0	0.0	0.0	0.0	0.0	0.0	8.8	28.5	57.8	142.7	661.6	317.5	496.8	762.1	1293.4	530.7	86.0	105.5	139.3
1998	66	0.0	0.0	0.0	7.7	26.8	36.0	26.6	27.0	22.4	56.0	225.5	165.0	252.7	441.2	435.5	80.6	49.1	52.4	65.2
1999	58	0.0	0.0	6.2	7.4	9.1	0.0	0.0	51.5	53.6	66.2	112.1	220.3	202.7	339.8	315.3	248.1	42.9	44.2	56.2
2000	60	8.7	6.4	6.1	7.1	0.0	9.9	9.2	43.4	29.9	61.9	145.3	148.4	319.4	244.9	329.5	229.0	44.2	45.7	56.8
Females																				
1989	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1990	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	53	0.0	0.0	0.0	0.0	18.8	0.0	8.0	38.1	48.8	110.2	134.2	137.8	191.7	193.8	234.7	90.3	39.3	35.4	46.0
1996	82	0.0	0.0	0.0	8.4	9.4	17.3	39.6	46.0	46.4	162.9	260.9	207.7	294.9	241.8	272.2	180.0	60.3	56.4	70.0
1997	76	0.0	0.0	0.0	0.0	18.8	8.7	15.7	26.5	88.5	56.4	250.9	138.4	290.3	466.3	305.7	59.6	55.2	50.5	64.4
1998	66	0.0	6.5	0.0	0.0	9.0	26.1	7.9	33.4	64.3	70.0	176.4	144.0	295.6	316.1	126.1	98.0	47.3	44.0	54.4
1999	47	0.0	0.0	0.0	0.0	0.0	8.7	24.2	7.9	71.3	62.8	155.4	82.4	207.0	157.0	160.3	35.7	33.2	30.7	38.6
2000	56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39.5	30.4	46.0

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)
ASR (W) = Age-standardized rate (World Standard Population)

Table AIII.6. Annual cancer incidence per 100,000 population by sex and age group, all cancer sites combined (ICD-9: 140-208), Lenkoran.

Year	*Cases*	*0-*	*5-*	*10-*	*15-*	*20-*	*25-*	*30-*	*35-*	*40-*	*45-*	*50-*	*55-*	*60-*	*65-*	*70-*	*75+*	*CR*	*ASR (AZE)*	*ASR (W)*
Males																				
1989	57	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	70.8	-	-
1990	73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	89.2	-	-
1991	82	0.0	0.0	11.5	12.3	0.0	26.2	0.0	0.0	52.3	295.6	348.9	500.5	650.7	945.1	169.8	1103.3	97.8	111.9	142.4
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	69	0.0	19.2	0.0	12.3	11.9	26.2	0.0	0.0	64.6	130.1	132.1	318.5	531.7	716.5	862.3	959.5	0.0	89.7	116.3
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	77	0.0	0.0	0.0	23.9	49.2	0.0	0.0	14.7	18.4	209.1	254.1	343.0	562.9	545.0	1185.9	887.9	85.1	96.8	127.4
1996	80	0.0	0.0	0.0	11.7	12.4	37.3	25.4	85.2	87.5	384.3	276.2	200.5	416.4	667.7	665.8	550.7	87.4	90.9	122.8
1997	100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.3	66.7	176.2	652.1	400.2	681.6	869.2	1552.7	764.2	107.6	123.9	164.5
1998	51	0.0	0.0	0.0	11.2	38.7	39.0	12.8	39.0	32.4	80.9	279.2	170.2	365.0	409.6	269.6	116.4	0.0	59.5	72.5
1999	42	0.0	0.0	9.0	10.7	13.1	0.0	0.0	49.6	46.5	47.9	121.7	227.7	260.6	357.4	380.0	119.6	44.9	45.4	57.8
2000	49	12.6	9.2	0.0	10.3	0.0	14.3	0.0	50.2	43.3	89.7	175.3	161.1	396.3	354.5	272.6	221.0	52.2	53.2	67.1
Females																				
1989	68	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	80.5	-	-
1990	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	51.3	-	-
1991	52	0.0	0.0	12.1	0.0	49.6	0.0	51.0	54.2	49.4	45.4	192.1	114.6	263.9	211.6	168.7	474.3	59.2	54.0	61.0
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	46	0.0	0.0	11.4	12.7	13.1	0.0	11.7	61.9	142.3	160.2	206.8	207.9	152.8	89.0	75.4	174.1	0.0	47.3	58.2
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	40	0.0	0.0	0.0	0.0	27.1	0.0	0.0	54.9	70.3	95.2	154.6	74.4	214.7	199.3	338.0	130.0	42.7	38.3	50.0
1996	68	0.0	0.0	0.0	12.1	13.6	12.5	34.3	53.0	66.8	176.1	292.5	274.5	394.7	232.3	326.9	259.4	72.1	67.1	83.1
1997	55	0.0	0.0	0.0	0.0	27.0	12.6	22.6	25.5	111.6	54.2	225.9	174.4	179.2	522.5	377.5	42.9	58.6	51.3	65.5
1998	58	0.0	9.4	0.0	0.0	13.0	37.7	11.4	48.3	92.9	75.8	212.3	148.5	313.0	456.5	182.1	141.6	0.0	54.9	67.9
1999	37	0.0	0.0	0.0	0.0	0.0	0.0	23.3	0.0	88.4	90.8	112.4	79.4	272.2	227.1	173.9	51.7	37.8	32.5	43.2
2000	48	0.0	0.0	0.0	0.0	0.0	12.9	118.7	103.0	68.3	148.5	0.0	46.9	164.0	149.1	212.9	50.4	49.0	38.0	45.5

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)
ASR (W) = Age-standardized rate (World Standard Population)

Table AIII.7. Annual cancer incidence per 100,000 population by sex and age group, all cancer sites combined (ICD-9: 140-208), Astara.

Year	*Cases*	*0-*	*5-*	*10-*	*15-*	*20-*	*25-*	*30-*	*35-*	*40-*	*45-*	*50-*	*55-*	*60-*	*65-*	*70-*	*75+*	*CR*	*ASR (AZE)*	*ASR (W)*
Males																				
1989	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1990	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	24	0.0	0.0	0.0	0.0	0.0	0.0	28.9	100.2	125.7	158.5	96.3	194.9	399.8	337.8	539.1	252.5	60.3	60.3	79.4
1996	24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	145.1	208.6	259.6	471.8	432.3	1005.8	498.8	59.4	66.8	91.5
1997	21	0.0	0.0	0.0	0.0	0.0	0.0	28.7	31.0	37.8	66.6	683.1	129.7	77.3	519.1	704.8	0.0	51.3	63.7	82.0
1998	15	0.0	0.0	0.0	0.0	0.0	29.3	57.6	0.0	0.0	0.0	104.8	153.3	0.0	512.4	809.2	0.0	36.3	36.5	48.7
1999	16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	55.6	69.4	107.2	90.8	204.0	73.0	300.2	170.3	536.2	38.4	41.5	52.7
2000	11	0.0	0.0	19.8	0.0	0.0	0.0	29.7	28.1	0.0	0.0	78.3	120.0	147.6	0.0	456.7	246.9	26.2	28.9	33.9
Females																				
1989	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1990	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	13	0.0	0.0	0.0	0.0	0.0	0.0	26.0	0.0	0.0	144.2	87.8	281.9	139.4	181.2	0.0	0.0	31.6	28.8	36.9
1996	14	0.0	0.0	0.0	0.0	0.0	28.3	51.8	30.0	0.0	133.0	189.3	56.5	68.8	263.2	148.2	0.0	33.6	32.0	40.5
1997	21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.9	36.2	61.5	307.6	56.5	542.3	338.8	142.8	97.4	49.8	48.8	61.9
1998	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	56.9	95.6	133.8	256.3	0.0	0.0	0.0	18.6	19.4	23.8
1999	10	0.0	0.0	0.0	0.0	0.0	28.3	26.1	25.6	33.0	0.0	251.7	89.0	61.0	0.0	129.8	0.0	22.9	26.5	28.5
2000	8	0.0	0.0	0.0	0.0	0.0	28.9	0.0	25.6	0.0	142.1	0.0	0.0	122.1	83.3	0.0	0.0	18.2	13.4	19.8

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)
ASR (W) = Age-standardized rate (World Standard Population)

Table AIII.8. Annual incidence per 100,000 population by sex and age group, laryngeal cancer (ICD-9: 161), Azerbaijan.

Year	*Cases*	*0-*	*5-*	*10-*	*15-*	*20-*	*25-*	*30-*	*35-*	*40-*	*45-*	*50-*	*55-*	*60-*	*65-*	*70-*	*75+*	*CR*	*ASR (AZE)*	*ASR (W)*
Males																				
1989	218	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.3	-	-
1990	323	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.2	-	-
1991	236	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.9	1.2	9.3	10.8	41.3	61.4	130.1	28.1	9.5	6.6	7.4	10.0
1992	268	0.0	0.0	0.0	0.3	0.3	0.0	0.6	6.4	9.0	30.2	19.4	36.3	40.1	62.4	86.3	51.8	7.4	8.3	11.5
1993	135	0.0	0.0	0.0	0.0	0.0	0.0	1.2	2.4	2.6	3.1	12.6	11.1	24.6	45.7	41.2	30.6	3.7	4.1	5.4
1994	150	0.0	0.0	0.0	0.0	0.0	0.3	0.9	2.2	5.2	4.5	12.1	19.2	28.9	37.6	36.9	18.4	4.0	4.3	5.6
1995	181	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.4	2.2	9.2	12.2	18.5	27.0	54.6	93.8	18.6	4.8	5.0	7.2
1996	163	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3	3.8	5.4	6.6	13.0	31.6	40.0	82.3	42.2	4.3	4.6	6.4
1997	140	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.3	2.8	4.2	8.4	19.3	31.2	34.1	44.8	0.0	3.6	3.6	4.9
1998	115	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.8	7.1	8.9	15.5	25.5	32.8	19.4	0.0	3.0	3.0	4.0
1999	111	0.0	0.0	0.0	0.0	0.0	0.7	0.0	1.5	1.9	6.9	17.5	18.5	16.4	16.1	18.2	17.2	2.8	3.3	4.1
2000	115	0.0	0.2	0.0	0.0	0.0	0.3	0.6	0.3	3.4	3.7	15.9	11.5	18.9	10.6	50.4	0.0	2.9	2.9	3.9
Females																				
1989	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.9	-	-
1990	54	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5	-	-
1991	31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	1.7	7.4	7.8	1.2	2.0	1.0	0.8	0.8	1.0
1992	51	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.4	0.0	1.1	9.3	2.6	3.0	20.9	11.5	1.0	1.4	1.2	1.7
1993	55	0.0	0.0	0.0	0.0	0.6	0.8	0.0	0.0	0.0	0.0	0.7	1.2	1.5	40.4	5.4	4.2	1.4	1.2	1.7
1994	24	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.4	0.8	1.7	2.4	4.4	6.9	1.7	0.0	0.6	0.6	0.7
1995	40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	4.6	2.3	2.8	2.4	5.1	4.8	6.5	2.1	1.0	0.9	1.2
1996	27	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3	0.4	1.4	4.0	1.8	3.6	6.5	4.7	0.0	0.7	0.6	0.9
1997	27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.7	10.9	3.0	2.2	4.5	0.0	1.0	0.7	0.8	1.0
1998	29	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.6	0.7	0.6	1.0	2.1	4.8	4.6	8.7	1.1	0.7	0.6	0.8
1999	19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.9	1.9	2.6	7.3	4.2	0.0	0.5	0.4	0.6
2000	28	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.5	0.7	0.5	1.6	4.5	2.0	6.2	1.3	6.0	0.7	0.7	0.8

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)
ASR (W) = Age-standardized rate (World Standard Population)

Table AIII.9. Annual incidence per 100,000 population by sex and age group, laryngeal cancer (ICD-9: 161), Sumgayit.

Year	*Cases*	*0-*	*5-*	*10-*	*15-*	*20-*	*25-*	*30-*	*35-*	*40-*	*45-*	*50-*	*55-*	*60-*	*65-*	*70-*	*75+*	*CR*	*ASR (AZE)*	*ASR (W)*
Males																				
1989	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.0	-	-
1990	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.3	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	7	0.0	0.0	0.0	0.0	7.7	0.0	0.0	11.7	15.4	31.9	0.0	19.5	24.0	45.1	0.0	0.0	5.3	5.3	7.3
1993	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.2	0.0	21.7	0.0	0.0	0.0	0.0	0.0	1.5	1.7	1.9
1994	*2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.1	0.0	0.0	0.0	0.0	0.0	34.7	0.0	0.0	1.5	1.3	1.6
1995	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.3	0.0	70.4	99.1	158.2	222.2	8.8	11.4	14.8
1996	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.8	0.0	0.0	63.8	74.2	0.0	2.9	3.4	4.9
1997	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.2	11.2	0.0	33.8	19.2	0.0	0.0	0.0	0.0	2.9	3.4	3.7
1998	6	0.0	0.0	0.0	0.0	0.0	0.0	17.1	0.0	0.0	0.0	31.2	22.8	44.5	0.0	0.0	0.0	4.3	5.3	5.3
1999	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.1	27.2	0.0	21.9	30.0	51.0	0.0	3.6	3.4	5.1
2000	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.7	0.0	0.0	72.1	66.5	29.7	45.7	0.0	5.7	6.5	7.9
Females																				
1989	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
1990	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	2	0.0	0.0	7.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.0	0.0	0.0	0.0	0.0	0.0	1.5	1.5	1.5
1993	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1994	*2	0.0	0.0	0.0	0.0	0.0	0.0	7.7	0.0	12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.2	1.2
1995	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.1	0.0	26.6	0.0	0.0	2.1	1.8	2.1
1996	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.3	25.9	0.0	0.0	1.4	1.1	1.6
1997	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.7	0.0	30.4	0.0	20.1	0.0	0.0	28.9	2.8	3.1	3.5
1998	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1999	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2000	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.3	0.0	0.0	0.0	0.7	0.6	0.7

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)
ASR (W) = Age-standardized rate (World Standard Population)

* Note that the Azerbaijan Repubic Ministry of Health recorded a total of 9 laryngeal cancers in 1994. However, only 4 individuals (2 males and 2 females) were recorded on the sex-specific form from which the above data were abstracted.

Table AIII.10. Annual incidence per 100,000 population by sex and age group, laryngeal cancer (ICD-9: 161), Ganja.

Year	Cases	0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	CR	ASR (AZE)	ASR (W)
Males																				
1989	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.4	-	-
1990	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.0	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	58.8	0.0	90.1	0.0	41.6	95.0	0.0	6.3	6.7	10.3
1993	6	0.0	0.0	0.0	0.0	0.0	0.0	7.8	0.0	13.1	0.0	20.1	35.3	0.0	36.4	0.0	0.0	4.2	4.3	4.8
1994	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.9	52.7	43.6	32.2	0.0	0.0	5.5	6.3	7.2
1995	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.1	0.0	0.0	0.0	17.7	0.0	30.7	0.0	0.0	2.1	1.8	2.2
1996	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.9	0.0	29.8	69.3	137.5	3.4	4.6	5.7
1997	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	31.7	54.3	0.0	86.9	65.5	0.0	5.4	5.9	7.7
1998	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.3	34.2	0.0	0.0	21.0	28.9	0.0	0.0	3.4	2.5	4.4
1999	9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.9	0.0	30.5	25.8	58.0	41.5	28.4	0.0	0.0	6.1	6.6	8.4
2000	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.4	0.0	0.0	0.0	21.1	0.0	87.0	0.0	3.4	2.4	3.7
Females																				
1989	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7	-	-
1990	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.4	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1993	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1994	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1995	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.8	0.7	0.5	0.5
1996	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1997	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1998	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.9	0.0	36.1	0.0	0.0	0.0	2.0	2.4	2.8
1999	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.1	36.9	0.0	1.3	0.8	1.5
2000	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.8	0.0	0.0	0.7	0.4	0.7

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)
ASR (W) = Age-standardized rate (World Standard Population)

Table AIII.11. Annual incidence per 100,000 population by sex and age group, laryngeal cancer (ICD-9: 161), Lenkoran-Astara.

Year	*Cases*	*0-*	*5-*	*10-*	*15-*	*20-*	*25-*	*30-*	*35-*	*40-*	*45-*	*50-*	*55-*	*60-*	*65-*	*70-*	*75+*	*CR*	*ASR (AZE)*	*ASR (W)*
Males																				
1989	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1990	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.4	82.4	77.1	2.3	3.0	4.2
1996	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.1	33.1	0.0	0.0	1.5	1.4	2.0
1997	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.8	19.8	0.0	63.5	0.0	0.0	3.0	3.5	4.4
1998	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.7	32.2	0.0	0.0	31.5	0.0	0.0	2.2	2.5	3.7
1999	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.6	0.0	0.0	28.0	0.0	0.0	0.0	0.0	0.0	1.5	1.8	1.9
2000	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	45.6	30.6	47.1	0.0	2.9	2.6	3.7
Females																				
1989	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1990	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.9	0.0	0.7	0.5	0.9
1996	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.5	0.7
1997	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1998	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.7	0.0	0.0	0.0	0.0	0.0	42.0	0.0	1.4	0.9	1.5
1999	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2000	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.4	0.6

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)
ASR (W) = Age-standardized rate (World Standard Population)

Table AIII.12. Annual incidence per 100,000 population by sex and age group, laryngeal cancer (ICD-9: 161), Lenkoran.

Year	*Cases*	*0-*	*5-*	*10-*	*15-*	*20-*	*25-*	*30-*	*35-*	*40-*	*45-*	*50-*	*55-*	*60-*	*65-*	*70-*	*75+*	*CR*	*ASR (AZE)*	*ASR (W)*
Males																				
1989	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.7	-	-
1990	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.7	-	-
1991	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	49.3	53.7	0.0	38.3	0.0	0.0	0.0	4.8	4.9	7.2
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.4	0.0	0.0	0.0	1.1	1.2	1.4
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	49.5	118.6	111.0	3.3	4.3	6.1
1996	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.7	0.0	0.0	0.0	1.1	1.1	1.4
1997	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.6	0.0	0.0	0.0	0.0	1.1	1.1	1.1
1998	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.0	46.5	0.0	0.0	45.5	0.0	0.0	3.2	3.6	5.3
1999	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.4	0.0	0.0	40.6	0.0	0.0	0.0	0.0	0.0	2.1	2.6	2.8
2000	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	66.0	44.3	0.0	0.0	3.2	3.0	4.0
Females																				
1989	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2	-	-
1990	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
1991	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	84.3	0.0	1.1	0.9	1.7
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	67.6	0.0	1.1	0.7	1.4
1996	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.8	1.0
1997	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1998	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.5	0.0	0.0	0.0	0.0	0.0	60.7	0.0	2.1	1.3	2.1
1999	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2000	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.6	0.8

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)
ASR (W) = Age-standardized rate (World Standard Population)

Table AIII.13. Annual incidence per 100,000 population by sex and age group, laryngeal cancer (ICD-9: 161), Astara.

Year	*Cases*	*0-*	*5-*	*10-*	*15-*	*20-*	*25-*	*30-*	*35-*	*40-*	*45-*	*50-*	*55-*	*60-*	*65-*	*70-*	*75+*	*CR*	*ASR (AZE)*	*ASR (W)*
Males																				
1989	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1990	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1996	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	108.1	0.0	0.0	2.5	2.0	3.2
1997	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	113.8	0.0	0.0	207.6	0.0	0.0	7.3	9.1	11.9
1998	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1999	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2000	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	152.2	0.0	2.4	1.6	3.0
Females																				
1989	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1990	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1996	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1997	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1998	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1999	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2000	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)
ASR (W) = Age-standardized rate (World Standard Population)

Table AIII.14. Annual incidence per 100,000 population by sex and age group, cancer of the trachea, bronchus, and lung (ICD-9: 162), Azerbaijan.

Year	*Cases*	*0-*	*5-*	*10-*	*15-*	*20-*	*25-*	*30-*	*35-*	*40-*	*45-*	*50-*	*55-*	*60-*	*65-*	*70-*	*75+*	*CR*	*ASR (AZE)*	*ASR (W)*
Males																				
1989	786	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22.6	-	-
1990	891	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25.4	-	-
1991	694	0.0	0.0	0.0	0.0	0.9	0.0	2.3	2.3	9.3	41.9	58.9	118.9	141.8	213.8	232.5	104.1	19.5	22.2	29.9
1992	611	0.0	0.0	0.3	0.0	0.3	0.6	3.8	5.5	9.5	44.1	53.5	111.0	116.8	141.2	176.4	66.6	16.9	18.7	24.8
1993	568	0.0	0.0	0.0	0.0	0.3	0.6	0.9	2.4	15.5	37.3	63.2	71.3	99.2	155.6	192.4	63.7	15.5	17.0	23.2
1994	497	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	7.1	22.4	67.2	57.5	107.1	96.6	187.4	89.6	13.3	15.2	20.2
1995	476	0.0	0.0	0.0	0.0	0.0	0.9	1.5	4.6	6.2	17.5	34.5	58.2	84.3	103.3	196.0	119.7	12.6	14.1	18.7
1996	495	0.0	0.0	0.0	0.0	0.3	0.3	0.9	2.7	3.3	14.6	44.1	52.1	91.4	141.6	178.0	100.1	12.9	14.3	19.1
1997	451	0.0	0.0	0.0	0.3	0.6	0.6	0.3	2.6	2.8	12.0	47.1	55.0	81.2	105.7	176.8	73.6	11.7	12.9	17.2
1998	468	0.0	0.0	0.0	0.0	0.0	0.6	0.9	4.4	7.0	14.9	34.6	67.8	86.7	113.5	120.7	69.8	12.1	12.9	16.8
1999	430	0.0	0.0	0.4	0.0	0.0	1.0	0.6	3.9	7.8	18.9	43.7	69.8	66.4	92.1	102.0	57.3	11.0	12.0	15.6
2000	488	0.0	0.0	0.0	0.0	0.0	0.7	1.0	3.9	8.6	20.3	31.8	74.3	96.1	98.3	123.5	52.7	12.4	12.9	17.0
Females																				
1989	208	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.85	-	-
1990	308	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.47	-	-
1991	169	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.4	0.6	6.4	7.9	25.7	34.3	42.4	37.8	8.1	0.83	4.1	5.5
1992	118	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.8	3.2	7.5	6.8	13.5	19.6	16.3	24.9	15.6	1.35	2.8	3.7
1993	128	0.0	0.0	0.0	0.0	0.0	0.3	0.6	0.0	0.0	10.5	6.4	12.4	23.4	25.5	25.2	15.6	1.44	2.9	4.0
1994	172	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.0	2.2	4.1	10.1	29.4	18.4	44.3	27.0	10.4	0.62	3.8	5.0
1995	139	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.0	0.8	5.3	7.4	10.1	21.3	24.8	48.6	17.7	1.02	3.0	4.1
1996	127	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.6	2.0	6.3	12.0	9.6	15.3	23.2	39.1	10.3	0.69	2.8	3.9
1997	100	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.0	1.9	3.3	9.8	6.0	12.2	18.0	31.8	10.3	0.68	2.2	3.0
1998	78	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.2	0.7	1.2	5.1	6.4	12.3	16.4	11.6	12.5	0.72	1.7	2.2
1999	100	0.0	0.0	0.0	0.0	0.0	0.3	0.0	1.4	2.8	3.3	9.0	13.3	13.0	17.2	12.5	9.9	0.47	2.3	2.9
2000	117	0.0	0.0	0.0	0.0	0.0	0.9	0.3	0.5	2.6	4.6	3.9	14.5	11.7	18.7	25.4	20.4	0.68	2.5	3.3

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)
ASR (W) = Age-standardized rate (World Standard Population)

Table AIII.15. Annual incidence per 100,000 population by sex and age group, cancer of the trachea, bronchus, and lung (ICD-9: 162), Sumgayit.

Year	*Cases*	*0-*	*5-*	*10-*	*15-*	*20-*	*25-*	*30-*	*35-*	*40-*	*45-*	*50-*	*55-*	*60-*	*65-*	*70-*	*75+*	*CR*	*ASR (AZE)*	*ASR (W)*
Males																				
1989	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25.5	-	-
1990	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23.7	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	34	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.7	31.9	19.1	195.5	119.8	496.2	0.0	271.0	25.9	29.0	37.6
1993	30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	56.7	85.6	87.0	76.2	116.7	196.5	283.9	140.3	22.5	24.8	35.0
1994	32	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	52.6	123.8	129.2	75.8	47.1	104.1	255.2	437.6	23.8	28.9	38.9
1995	17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.3	57.2	70.4	132.2	158.2	296.3	12.5	15.6	19.6
1996	28	0.0	0.0	0.0	0.0	0.0	0.0	17.0	9.5	11.7	0.0	0.0	76.6	185.6	127.6	445.2	147.2	20.5	21.5	28.5
1997	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	59.3	67.5	77.0	22.9	30.8	139.3	514.7	14.5	20.3	24.9
1998	27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.2	31.2	91.3	133.5	152.6	241.0	390.6	19.4	23.1	29.9
1999	30	0.0	0.0	6.0	0.0	0.0	0.0	0.0	8.3	20.8	48.2	108.8	91.7	131.1	179.9	102.0	160.5	21.5	23.6	30.2
2000	28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.4	9.7	45.1	70.6	180.2	199.4	89.2	91.4	74.1	20.0	22.9	28.5
Females																				
1989	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.1	-	-
1990	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.8	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.4	20.7	0.0	0.0	28.5	2.9	2.6	2.8
1993	14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.4	0.0	52.7	0.0	34.2	60.4	0.0	149.0	57.3	10.1	8.5	12.3
1994	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.5	0.0	46.8	0.0	61.0	0.0	93.5	57.7	7.2	6.8	8.5
1995	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.1	20.5	53.2	90.2	0.0	5.0	3.9	5.5
1996	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.6	55.9	0.0	20.3	51.8	87.4	0.0	5.7	5.6	8.1
1997	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.5	18.2	0.0	33.5	0.0	50.2	0.0	86.7	7.0	5.3	7.0
1998	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.9	38.2	0.0	40.7	31.6	3.5	3.1	3.8
1999	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.7	9.9	0.0	50.3	53.3	0.0	0.0	0.0	0.0	4.1	5.3	5.7
2000	14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.7	0.0	28.5	0.0	31.5	73.4	50.0	71.4	67.6	9.6	7.8	10.6

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)
ASR (W) = Age-standardized rate (World Standard Population)

Table AIII.16. Annual incidence per 100,000 population by sex and age group, cancer of the trachea, bronchus, and lung (ICD-9: 162), Ganja.

Year	*Cases*	*0-*	*5-*	*10-*	*15-*	*20-*	*25-*	*30-*	*35-*	*40-*	*45-*	*50-*	*55-*	*60-*	*65-*	*70-*	*75+*	*CR*	*ASR (AZE)*	*ASR (W)*
Males																				
1989	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25.4	-	-
1990	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23.7	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	39	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	58.8	140.6	144.1	220.8	166.3	570.2	62.5	27.4	31.0	42.8
1993	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.1	26.3	26.5	120.9	88.3	129.8	72.9	87.7	65.0	17.4	19.3	23.8
1994	21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	45.9	143.7	87.8	87.2	64.3	0.0	135.1	14.4	17.8	21.6
1995	25	0.0	0.0	0.0	0.0	0.0	7.8	0.0	18.2	11.4	43.1	78.6	53.1	174.2	122.6	0.0	68.7	17.1	18.5	23.1
1996	28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.9	21.8	40.0	201.1	71.5	108.3	89.3	138.5	137.5	19.1	23.9	29.7
1997	26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.6	10.5	18.6	63.5	162.8	151.0	115.8	0.0	69.1	17.7	19.2	22.8
1998	28	0.0	0.0	0.0	0.0	0.0	8.2	0.0	8.2	30.8	34.2	29.5	43.2	189.4	202.0	114.0	0.0	19.1	17.7	24.2
1999	26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.9	19.7	60.9	51.6	173.9	62.2	142.2	145.2	0.0	17.7	18.2	24.5
2000	24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	27.7	28.6	0.0	102.8	63.2	169.7	173.9	141.0	16.3	16.2	21.9
Females																				
1989	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.8	-	-
1990	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.2	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.1	0.0	27.2	15.7	32.7	38.2	29.4	0.0	0.0	5.4	5.1	6.7
1993	2	0.0	0.0	0.0	7.8	0.0	0.0	7.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.3	1.1
1994	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	37.7	50.5	0.0	26.7	3.3	2.7	3.6
1995	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.6	0.0	15.3	19.0	0.0	0.0	53.6	3.3	2.7	3.6
1996	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.0	0.0	81.6	27.0	2.6	2.0	2.9
1997	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.2	57.2	0.0	18.9	0.0	79.6	54.3	5.3	5.5	7.3
1998	4	0.0	0.0	0.0	0.0	0.0	0.0	7.3	0.0	0.0	0.0	0.0	0.0	0.0	24.1	77.0	0.0	2.6	1.9	2.7
1999	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.9	0.0	0.0	0.0	24.1	73.8	0.0	3.3	1.9	3.9
2000	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.9	69.8	0.0	0.0	64.3	4.6	4.7	5.3

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)
ASR (W) = Age-standardized rate (World Standard Population)

Table AIII.17. Annual incidence per 100,000 population by sex and age group, cancer of the trachea, bronchus, and lung (ICD-9: 162), Lenkoran-Astara.

Year	*Cases*	*0-*	*5-*	*10-*	*15-*	*20-*	*25-*	*30-*	*35-*	*40-*	*45-*	*50-*	*55-*	*60-*	*65-*	*70-*	*75+*	*CR*	*ASR (AZE)*	*ASR (W)*
Males																				
1989	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1990	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	14	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.4	39.7	73.3	137.6	329.4	0.0	10.7	11.3	16.7
1996	13	0	0.0	0.0	0.0	0.0	0.0	0.0	19.7	0.0	22.2	63.9	19.9	48.2	66.2	154.0	76.4	9.9	11.4	15.0
1997	14	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	59.5	47.3	127.0	287.4	75.8	10.5	10.7	15.3
1998	12	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.2	0.0	32.2	47.2	23.0	189.1	62.2	0.0	8.9	8.7	12.0
1999	11	0	0.0	0.0	0.0	0.0	0.0	0.0	8.6	10.7	0.0	28.0	0.0	45.0	123.6	105.1	0.0	8.1	7.2	10.2
2000	8	0	0.0	0.0	0.0	0.0	0.0	0.0	8.7	10.0	0.0	0.0	0.0	45.6	0.0	94.1	152.7	5.9	6.4	7.9
Females																				
1989	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1990	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1996	6	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.0	51.9	0.0	26.9	45.4	0.0	4.4	4.3	5.2
1997	3	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.7	0.0	0.0	0.0	0.0	29.8	2.2	3.5	3.7
1998	2	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.7	26.3	0.0	0.0	1.4	1.1	1.6
1999	1	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.8	0.0	0.0	0.0	0.7	0.6	0.8
2000	3	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.7	0.0	0.0	0.0	25.8	36.8	0.0	2.1	1.2	2.4

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)   ASR (W) = Age-standardized rate (World Standard Population)

Table AIII.18. Annual incidence per 100,000 population by sex and age group, cancer of the trachea, bronchus, and lung (ICD-9: 162), Lenkoran.

Year	*Cases*	*0-*	*5-*	*10-*	*15-*	*20-*	*25-*	*30-*	*35-*	*40-*	*45-*	*50-*	*55-*	*60-*	*65-*	*70-*	*75+*	*CR*	*ASR (AZE)*	*ASR (W)*
Males																				
1989	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.7	-	-
1990	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17.1	-	-
1991	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	80.5	62.6	38.3	236.3	169.8	100.3	13.1	15.4	20.6
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	99.1	57.9	106.3	59.7	0.0	0.0	10.3	11.4	13.3
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.4	28.6	70.4	148.6	355.8	0.0	11.0	11.8	17.7
1996	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.4	0.0	32.0	92.1	28.6	34.7	47.7	111.0	110.1	10.9	13.2	16.6
1997	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	85.8	68.2	183.0	207.0	109.2	12.9	13.2	18.0
1998	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.2	0.0	46.5	34.0	33.2	182.1	0.0	0.0	8.6	8.7	11.4
1999	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.5	0.0	40.6	0.0	65.2	89.4	152.0	0.0	8.6	7.9	11.3
2000	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.6	14.4	0.0	0.0	0.0	33.0	0.0	68.1	221.0	6.4	7.5	8.7
Females																				
1989	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.0	-	-
1990	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.3	-	-
1991	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	43.1	1.1	0.8	0.9
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.5	0.0	0.0	0.0	0.0	43.5	1.1	2.2	2.3
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1996	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.8	74.9	0.0	38.7	65.4	0.0	6.4	6.2	7.6
1997	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	90.3	0.0	0.0	0.0	0.0	0.0	2.1	4.2	4.5
1998	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38.0	0.0	0.0	1.0	0.7	1.1
1999	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.2	0.0	0.0	0.0	1.0	0.9	1.1
2000	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	37.3	53.2	0.0	2.0	1.2	2.2

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)
ASR (W) = Age-standardized rate (World Standard Population)

Table AIII.19. Annual incidence per 100,000 population by sex and age group, cancer of the trachea, bronchus, and lung (ICD-9: 162), Astara.

Year	*Cases*	*0-*	*5-*	*10-*	*15-*	*20-*	*25-*	*30-*	*35-*	*40-*	*45-*	*50-*	*55-*	*60-*	*65-*	*70-*	*75+*	*CR*	*ASR (AZE)*	*ASR (W)*
Males																				
1989	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1990	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	65.0	80.0	112.6	269.5	0.0	10.0	10.0	14.6
1996	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	78.6	108.1	251.4	0.0	7.4	7.2	11.4
1997	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	469.9	0.0	4.9	4.9	9.4
1998	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	76.7	0.0	205.0	202.3	0.0	9.7	8.9	13.3
1999	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.8	0.0	0.0	0.0	0.0	0.0	200.2	0.0	0.0	7.2	5.4	7.7
2000	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	73.8	0.0	152.2	0.0	4.8	4.0	6.0
Females																				
1989	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1990	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1996	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1997	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	97.4	2.4	1.9	1.9
1998	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	64.1	0.0	0.0	0.0	2.3	2.1	2.6
1999	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2000	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.4	0.0	0.0	0.0	0.0	0.0	0.0	2.3	1.2	2.8

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)
ASR (W) = Age-standardized rate (World Standard Population)

Table AIII.20. Annual incidence per 100,000 population by sex and age group, cancer of the urinary bladder (ICD-9: 188), Azerbaijan.

Year	*Cases*	*0-*	*5-*	*10-*	*15-*	*20-*	*25-*	*30-*	*35-*	*40-*	*45-*	*50-*	*55-*	*60-*	*65-*	*70-*	*75+*	*CR*	*ASR (AZE)*	*ASR (W)*
Males																				
1989	162	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.7	-	-
1990	169	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.8	-	-
1991	159	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5	2.5	7.0	10.8	16.2	38.8	63.2	72.1	30.8	4.5	5.3	7.3
1992	160	0.0	0.0	0.0	0.0	0.0	0.0	0.6	2.1	7.8	1.2	11.8	12.8	34.0	32.8	78.8	56.7	4.4	5.3	6.9
1993	105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	11.1	32.2	51.4	37.8	5.1	2.9	3.0	4.2
1994	110	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.7	2.4	2.7	7.5	14.4	18.7	25.1	64.5	18.4	3.0	3.3	4.5
1995	129	0.2	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.9	2.5	11.2	8.2	24.4	34.4	59.7	47.9	3.4	4.0	5.4
1996	112	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.8	0.8	12.1	10.3	18.3	38.8	34.5	29.0	2.9	3.3	4.3
1997	95	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.3	0.8	2.1	9.7	8.9	17.2	28.6	17.4	28.9	2.5	2.8	3.6
1998	98	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.2	0.0	4.5	10.0	10.6	13.5	27.3	38.8	11.2	2.5	2.7	3.7
1999	101	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.5	0.7	0.6	7.8	14.2	18.7	26.8	31.0	14.3	2.6	2.8	3.6
2000	82	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.2	0.7	4.3	7.5	10.2	15.0	15.8	16.2	15.8	2.1	2.2	2.9
Females																				
1989	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7	-	-
1990	42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.1	-	-
1991	37	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	1.7	0.0	0.0	2.7	4.7	11.2	19.9	3.1	1.0	0.9	1.2
1992	56	0.0	0.0	0.0	0.0	0.0	0.0	0.9	2.4	0.5	7.5	0.6	3.9	3.8	15.1	11.5	8.3	1.5	1.3	1.9
1993	41	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	0.0	1.2	5.8	16.0	18.0	3.1	1.1	0.9	1.4
1994	20	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.8	0.6	5.1	5.9	3.4	1.0	0.5	0.4	0.6
1995	40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	3.7	4.2	5.9	3.8	13.0	7.3	1.0	0.9	1.2
1996	18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.7	0.0	0.6	1.5	5.6	6.3	1.0	0.5	0.3	0.5
1997	16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	2.2	0.6	5.0	2.7	1.5	1.0	0.4	0.4	0.5
1998	16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.9	2.7	2.7	4.4	0.0	0.4	0.4	0.5
1999	26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	2.7	1.8	4.8	4.6	3.6	1.4	0.0	0.6	0.6	0.8
2000	27	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3	0.0	2.3	5.6	5.9	1.8	3.8	3.6	0.7	0.7	0.8

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)
ASR (W) = Age-standardized rate (World Standard Population)

Table AIII.21. Annual incidence per 100,000 population by sex and age group, cancer of the urinary bladder (ICD-9: 188), Sumgayit.

Year	*Cases*	*0-*	*5-*	*10-*	*15-*	*20-*	*25-*	*30-*	*35-*	*40-*	*45-*	*50-*	*55-*	*60-*	*65-*	*70-*	*75+*	*CR*	*ASR (AZE)*	*ASR (W)*
Males																				
1989	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.6	-	-
1990	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.9	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	8	0.0	0.0	0.0	0.0	0.0	0.0	8.6	0.0	0.0	0.0	0.0	39.1	47.9	90.2	0.0	67.8	6.1	6.8	8.1
1993	13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.4	28.5	43.5	57.2	0.0	117.9	0.0	140.3	9.7	11.1	14.2
1994	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.8	19.0	23.5	104.1	0.0	291.8	7.4	10.3	12.0
1995	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	93.9	99.1	237.3	0.0	7.4	7.4	11.5
1996	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.2	95.7	222.6	367.9	8.8	11.9	15.6
1997	9	0.0	0.0	0.0	0.0	0.0	0.0	8.5	0.0	22.4	0.0	101.3	0.0	22.9	0.0	0.0	147.1	6.5	10.0	10.8
1998	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.7	0.0	0.0	31.2	0.0	44.5	91.6	0.0	0.0	5.0	5.1	6.6
1999	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.1	0.0	30.6	21.9	30.0	0.0	0.0	2.9	2.9	4.0
2000	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.4	0.0	0.0	23.5	36.0	88.6	29.7	91.4	74.1	7.9	8.9	10.9
Females																				
1989	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
1990	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.3	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.7	0.0	0.0	28.5	1.5	1.2	1.4
1993	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.5	0.0	20.1	0.0	0.0	0.0	1.4	1.6	1.8
1994	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.6	0.0	16.6	0.0	0.0	46.8	0.0	2.1	1.7	3.0
1995	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1996	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.3	0.0	0.0	0.0	0.0	51.8	0.0	0.0	2.8	2.0	2.9
1997	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.7	0.0	60.8	0.0	0.0	25.1	0.0	28.9	3.5	4.3	5.0
1998	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1999	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2000	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.2	0.0	0.0	0.0	18.3	0.0	0.0	0.0	1.4	1.0	1.3

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)
ASR (W) = Age-standardized rate (World Standard Population)

Table AIII.22. Annual incidence per 100,000 population by sex and age group, cancer of the urinary bladder (ICD-9: 188), Ganja.

Year	*Cases*	*0-*	*5-*	*10-*	*15-*	*20-*	*25-*	*30-*	*35-*	*40-*	*45-*	*50-*	*55-*	*60-*	*65-*	*70-*	*75+*	*CR*	*ASR (AZE)*	*ASR (W)*
Males																				
1989	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.9	-	-
1990	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.0	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.4	17.6	18.0	0.0	41.6	0.0	0.0	2.8	3.0	4.6
1993	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.7	0.0	36.4	0.0	65.0	2.1	2.6	3.1
1994	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.2	0.0	0.0	0.7	0.6	1.0
1995	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.7	43.5	0.0	0.0	68.7	2.7	3.4	3.8
1996	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.9	0.0	0.0	17.9	0.0	29.8	0.0	68.7	2.7	3.1	3.6
1997	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.6	0.0	0.0	69.1	1.4	2.0	2.2
1998	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.1	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.4	1.0
1999	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.9	0.0	25.8	29.0	62.2	85.3	96.8	0.0	7.5	7.4	10.0
2000	9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.0	0.0	14.3	0.0	0.0	63.2	28.3	0.0	141.0	6.1	6.7	8.0
Females																				
1989	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.1	-	-
1990	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	3	0.0	0.0	0.0	0.0	0.0	0.0	7.3	0.0	0.0	0.0	0.0	16.3	19.1	0.0	0.0	0.0	2.0	1.9	1.9
1993	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1994	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1995	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1996	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.2	0.0	0.0	0.7	0.4	0.7
1997	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.6	39.8	0.0	1.3	0.8	1.5
1998	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1999	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.7	0.0	0.0	0.0	1.3	1.1	1.4
2000	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.0	0.0	0.7	0.4	0.7

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)
ASR (W) = Age-standardized rate (World Standard Population)

Table AIII.23. Annual incidence per 100,000 population by sex and age group, cancer of the urinary bladder (ICD-9: 188), Lenkoran-Astara.

Year	*Cases*	*0-*	*5-*	*10-*	*15-*	*20-*	*25-*	*30-*	*35-*	*40-*	*45-*	*50-*	*55-*	*60-*	*65-*	*70-*	*75+*	*CR*	*ASR (AZE)*	*ASR (W)*
Males																				
1989	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1990	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	77.1	0.8	1.5	1.5
1996	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.9	0.0	0.0	31.9	0.0	0.0	0.0	0.0	0.0	1.5	2.1	2.2
1997	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39.7	0.0	31.8	0.0	0.0	2.2	2.1	2.5
1998	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	31.5	62.2	80.6	2.2	2.8	3.8
1999	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.0	0.0	0.0	30.9	0.0	0.0	1.5	1.9	2.3
2000	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.7	10.0	15.5	0.0	0.0	0.0	0.0	0.0	0.0	2.2	1.4	2.0
Females																				
1989	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1990	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1996	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.4	0.0	0.0	21.1	0.0	0.0	0.0	1.5	1.2	2.1
1997	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1998	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1999	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.9	0.0	0.0	0.0	0.0	0.0	0.7	1.2	1.3
2000	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.4	0.0	0.0	0.0	0.0	0.7	1.3	1.3

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)
ASR (W) = Age-standardized rate (World Standard Population)

Table AIII.24. Annual incidence per 100,000 population by sex and age group, cancer of the urinary bladder (ICD-9: 188), Lenkoran.

Year	*Cases*	*0-*	*5-*	*10-*	*15-*	*20-*	*25-*	*30-*	*35-*	*40-*	*45-*	*50-*	*55-*	*60-*	*65-*	*70-*	*75+*	*CR*	*ASR (AZE)*	*ASR (W)*
Males																				
1989	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.5	-	-
1990	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.4	-	-
1991	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38.3	0.0	0.0	0.0	1.2	1.3	1.5
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.4	0.0	0.0	0.0	1.1	1.2	1.4
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	111.0	1.1	2.1	-
1996	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.2	0.0	0.0	46.0	0.0	0.0	0.0	0.0	0.0	2.2	3.0	3.2
1997	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	57.2	0.0	45.7	0.0	0.0	3.2	3.1	3.7
1998	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	116.4	1.1	2.2	2.3
1999	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.7	0.0	0.0	1.1	0.8	1.3
2000	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.6	14.4	22.4	0.0	0.0	0.0	0.0	0.0	0.0	3.2	2.0	3.0
Females																				
1989	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
1990	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2	-	-
1991	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-
1996	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.4	0.0	0.0	30.4	0.0	0.0	0.0	2.1	1.7	3.0
1997	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1998	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1999	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2000	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.9	0.0	0.0	0.0	0.0	1.0	1.8	1.9

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)
ASR (W) = Age-standardized rate (World Standard Population)

Table AIII.25. Annual incidence per 100,000 population by sex and age group, cancer of the urinary bladder (ICD-9: 188), Astara.

Year	*Cases*	*0-*	*5-*	*10-*	*15-*	*20-*	*25-*	*30-*	*35-*	*40-*	*45-*	*50-*	*55-*	*60-*	*65-*	*70-*	*75+*	*CR*	*ASR (AZE)*	*ASR (W)*
Males																				
1989	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1990	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1996	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1997	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1998	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	102.5	202.3	0.0	4.8	4.0	7.1
1999	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	90.8	0.0	0.0	0.0	0.0	0.0	2.4	4.2	4.5
2000	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Females																				
1989	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1990	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1996	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1997	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1998	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1999	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	83.9	0.0	0.0	0.0	0.0	0.0	2.3	3.9	4.2
2000	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)
ASR (W) = Age-standardized rate (World Standard Population)

Table AIII.26. Annual incidence per 100,000 population by age group, cancer of the female breast (ICD-9: 174), Azerbaijan.[a]

Year	*Cases*	*0-*	*5-*	*10-*	*15-*	*20-*	*25-*	*30-*	*35-*	*40-*	*45-*	*50-*	*55-*	*60-*	*65-*	*70-*	*75+*	*CR*	*ASR (AZE)*	*ASR (W)*
Females																				
1989	644	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17.7	-	-
1990	1126 (1141)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30.7	-	-
1991	818 (813)	0.0	0.0	0.0	0.0	0.3	0.8	9.3	20.9	56.5	98.5	83.3	102.1	72.4	109.9	105.5	13.2	22.0 (21.9)	22.0	28.0
1992	653 (657)	0.0	0.0	0.0	0.0	0.9	3.6	14.7	27.5	42.3	65.6	48.9	52.3	51.3	69.7	84.2	45.7	17.3 (17.4)	17.1	20.6
1993	569	0.0	0.0	0.0	0.0	0.3	0.6	0.8	2.2	14.6	34.5	56.5	64.0	85.5	116.0	102.8	26.0	14.9	14.6	18.1
1994	580	0.0	0.0	0.0	0.3	0.6	2.0	7.2	19.1	37.3	71.1	48.2	59.5	51.4	49.2	47.3	14.6	15.0	14.2	17.9
1995	809	0.0	0.0	0.0	0.3	1.0	2.4	9.9	20.7	38.3	90.5	113.0	66.0	72.0	64.0	90.7	35.3	20.7	20.6	25.5
1996	754	0.0	0.0	0.0	0.0	1.6	1.5	5.7	15.9	32.0	45.7	92.0	66.9	108.3	79.7	93.9	30.0	19.1	19.0	22.7
1997	719	0.0	0.0	0.0	0.3	1.6	3.3	6.3	14.7	25.7	43.7	101.1	48.6	94.9	88.9	106.0	22.7	18.1	18.2	21.9
1998	673 (680)	0.0	0.0	0.5	0.0	0.6	2.1	7.1	12.7	26.4	41.8	75.4	64.1	88.7	87.6	84.4	4.5	16.7 (16.9)	16.4	19.8
1999	672	0.0	0.0	0.0	0.0	0.0	1.8	7.0	15.6	30.7	40.3	56.6	72.3	71.8	83.4	90.3	21.0	16.5	15.8	19.1
2000	665 (669)	0.0	0.0	0.0	0.0	0.3	1.2	8.2	16.4	22.5	43.5	54.3	62.6	57.3	86.2	85.0	45.6	16.2 (16.3)	15.3	18.3

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)
ASR (W) = Age-standardized rate (World Standard Population)

[a] Note that in cells where two values are entered, the upper value represents the sum of all age-specific groups, and the value in parentheses ( ) represents the number officially recorded by the Azerbaijan Republic Ministry of Health. There are several such discrepancies in the data.

Table AIII.27. Annual incidence per 100,000 population by age group, cancer of the female breast (ICD-9: 174), Sumgayit.

Year	*Cases*	*0-*	*5-*	*10-*	*15-*	*20-*	*25-*	*30-*	*35-*	*40-*	*45-*	*50-*	*55-*	*60-*	*65-*	*70-*	*75+*	*CR*	*ASR (AZE)*	*ASR (W)*
Females																				
1989	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17.5	-	-
1990	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30.1	-	-
1991	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26.5	-	-
1992	53	0.0	0.0	0.0	0.0	0.0	7.5	55.5	87.7	130.7	59.1	34.0	177.2	145.1	0.0	105.2	142.6	38.6	35.6	40.1
1993	26	0.0	0.0	0.0	0.0	0.0	39.0	7.7	40.7	0.0	52.7	97.3	0.0	60.4	58.6	198.6	0.0	18.7	17.8	22.2
1994	25	0.0	0.0	0.0	0.0	0.0	8.1	15.3	9.5	24.9	45.3	117.0	66.5	61.0	81.7	0.0	57.7	17.9	17.6	20.9
1995	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.4	21.2	283.6	49.6	81.8	79.8	45.1	0.0	17.8	21.2	25.4
1996	35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.3	0.0	111.7	133.5	243.6	103.6	131.1	57.8	24.8	23.8	28.9
1997	31	0.0	0.0	0.0	8.0	18.2	8.5	30.5	34.3	42.9	91.2	121.6	0.0	100.5	0.0	0.0	28.9	21.8	21.8	25.5
1998	20	0.0	0.0	0.0	0.0	0.0	8.4	7.7	32.4	20.8	67.8	85.4	59.8	19.1	25.5	0.0	0.0	13.9	13.5	16.6
1999	32	0.0	0.0	0.0	0.0	0.0	0.0	23.5	38.3	19.8	45.7	50.3	106.6	146.1	76.2	77.8	0.0	21.9	20.0	24.1
2000	41	0.0	0.0	0.0	0.0	0.0	0.0	8.0	23.0	64.1	128.1	152.9	94.4	128.4	25.0	71.4	33.8	28.1	25.0	32.8

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)
ASR (W) = Age-standardized rate (World Standard Population)

Table AIII.28. Annual incidence per 100,000 population by age group, cancer of the female breast (ICD-9: 174), Ganja.[b]

Year	*Cases*	*0-*	*5-*	*10-*	*15-*	*20-*	*25-*	*30-*	*35-*	*40-*	*45-*	*50-*	*55-*	*60-*	*65-*	*70-*	*75+*	*CR*	*ASR (AZE)*	*ASR (W)*
Females																				
1989	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21.5	-	34.4
1990	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26.0	-	23.6
1991	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22.3	-	16.2
1992	42 (26)	0.0	0.0	0.0	0.0	0.0	0.0	21.9	50.5	80.3	108.9	203.8	65.4	57.3	88.3	48.5	0.0	28.2 (17.5)	27.4	35.8
1993	31	0.0	0.0	0.0	0.0	8.0	7.2	28.6	37.8	24.8	73.3	36.1	63.4	55.9	135.7	92.0	0.0	20.7	18.7	22.2
1994	24	0.0	0.0	0.0	0.0	0.0	0.0	21.3	43.8	34.6	41.9	0.0	30.8	94.2	25.2	43.3	53.4	15.9	13.5	40.6
1995	42	0.0	0.0	0.0	0.0	0.0	0.0	21.3	42.5	65.2	78.5	310.9	61.4	56.9	74.0	41.8	0.0	27.8	29.8	22.3
1996	29	0.0	0.0	0.0	0.0	0.0	0.0	21.4	24.8	52.1	55.0	104.3	31.1	132.7	24.2	0.0	27.0	19.2	18.5	32.0
1997	56	0.0	0.0	0.0	0.0	0.0	0.0	7.2	56.4	90.8	85.8	114.4	189.2	151.2	94.5	119.5	81.5	37.1	32.6	24.9
1998	31	0.0	0.0	0.0	0.0	0.0	8.0	14.5	7.6	78.6	80.1	26.9	37.7	72.2	96.5	77.0	29.9	20.3	16.3	34.4
1999	39	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.3	46.9	115.6	190.8	101.2	17.3	120.5	73.8	32.9	25.4	24.2	23.6
2000	36	0.0	0.0	0.0	0.0	0.0	0.0	22.7	51.1	52.3	94.7	103.9	59.9	34.9	0.0	101.9	32.1	23.4	19.9	16.2

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)
ASR (W) = Age-standardized rate (World Standard Population)

[b] Note that in cells where two values are entered, the upper value represents the sum of all age-specific groups, and the value in parentheses ( ) represents the number officially recorded by the Azerbaijan Republic Ministry of Health. There are several such discrepancies in the data.

Table AIII.29. Annual incidence per 100,000 population by age group, cancer of the female breast (ICD-9: 174), Lenkoran-Astara.

Year	*Cases*	*0-*	*5-*	*10-*	*15-*	*20-*	*25-*	*30-*	*35-*	*40-*	*45-*	*50-*	*55-*	*60-*	*65-*	*70-*	*75+*	*CR*	*ASR (AZE)*	*ASR (W)*
Females																				
1989	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1990	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.4	44.1	0.0	68.9	42.6	0.0	0.0	30.1	8.2	6.9	9.2
1996	9	0.0	0.0	0.0	0.0	0.0	0.0	7.9	18.4	11.6	20.4	58.0	0.0	21.1	26.9	0.0	0.0	6.6	6.7	8.0
1997	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.8	22.1	37.6	125.4	34.6	103.7	103.6	0.0	0.0	14.5	14.9	19.0
1998	18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.1	42.9	17.5	0.0	82.3	78.8	52.7	0.0	0.0	12.9	10.7	13.2
1999	15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.7	31.4	103.6	27.5	56.5	0.0	40.1	0.0	10.6	10.7	13.7
2000	13	0.0	0.0	0.0	0.0	0.0	0.0	32.8	23.7	0.0	44.0	0.0	0.0	37.8	0.0	36.8	0.0	9.2	7.1	8.3

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)
ASR (W) = Age-standardized rate (World Standard Population)

Table AIII.30. Annual incidence per 100,000 population by age group, cancer of the female breast (ICD-9: 174), Lenkoran.[c]

Year	*Cases*	*0-*	*5-*	*10-*	*15-*	*20-*	*25-*	*30-*	*35-*	*40-*	*45-*	*50-*	*55-*	*60-*	*65-*	*70-*	*75+*	*CR*	*ASR (AZE)*	*ASR (W)*
Females																				
1989	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.6	-	-
1990	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.7	-	-
1991	15	0.0	0.0	0.0	0.0	0.0	0.0	25.5	36.1	49.4	45.4	48.0	86.0	33.0	52.9	0.0	43.1	17.1	16.3	19.0
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	8 (9)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.4	20.3	40.1	29.5	26.0	30.6	0.0	0.0	0.0	8.8 (9.9)	8.2	10.1
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.1	31.7	0.0	49.6	30.7	0.0	0.0	43.3	7.5	6.2	8.1
1996	6	0.0	0.0	0.0	0.0	0.0	0.0	11.4	26.5	16.7	29.4	41.8	0.0	0.0	0.0	0.0	0.0	6.4	6.1	7.1
1997	9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.9	27.1	90.3	49.8	29.9	74.6	0.0	0.0	9.4	9.9	12.5
1998	16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.2	61.9	25.3	0.0	59.4	113.8	76.1	0.0	0.0	16.5	13.2	16.6
1999	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.2	45.4	74.9	39.7	81.7	0.0	58.0	0.0	12.3	11.4	15.1
2000	13	0.0	0.0	0.0	0.0	0.0	0.0	47.5	34.3	0.0	63.6	0.0	0.0	54.7	0.0	53.2	0.0	13.3	10.2	12.0

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)
ASR (W) = Age-standardized rate (World Standard Population)

[c] Note that in cells where two values are entered, the upper value represents the sum of all age-specific groups, and the value in parentheses ( ) represents the number officially recorded by the Azerbaijan Republic Ministry of Health. There are several such discrepancies in the data.

Table AIII.31. Annual incidence per 100,000 population by age group, cancer of the female breast (ICD-9: 174), Astara.

Year	*Cases*	*0-*	*5-*	*10-*	*15-*	*20-*	*25-*	*30-*	*35-*	*40-*	*45-*	*50-*	*55-*	*60-*	*65-*	*70-*	*75+*	*CR*	*ASR (AZE)*	*ASR (W)*
Females																				
1989	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1990	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	72.1	0.0	112.7	69.7	0.0	0.0	0.0	9.7	8.5	11.6
1996	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	94.7	0.0	68.8	87.7	0.0	0.0	7.2	8.2	10.1
1997	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.9	36.2	61.5	205.1	0.0	271.1	169.4	0.0	0.0	26.1	26.4	33.8
1998	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	133.8	0.0	0.0	0.0	0.0	4.7	5.2	5.4
1999	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.0	0.0	167.8	0.0	0.0	0.0	0.0	0.0	6.9	9.2	10.4
2000	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Legend:
CR = Crude rate
ASR (AZE) = Age-standardized rate (1991 Azeri population)
ASR (W) = Age-standardized rate (World Standard Population)

Table AIII.32. Number of cancer deaths from all cancers combined (ICD-9: 140-208) and crude mortality rates per 100,000 population for selected regions of Azerbaijan (1980-2000).

Site	*Year*	*Azerbaijan*		*Sumgayit*		*Ganja*		*Lenkoran*		*Astara*	
		N	CR	N	CR	N	CR	N	CR	N	CR
All Sites	1980	4568	73.1	146	67.2	-	-	-	-	-	-
ICD-9: 140-208	1981	4626	72.8	138	61.3	200	80.1	81	54.0	31	49.1
	1982	4615	71.5	161	69.6	180	71.1	105	68.6	18	27.9
	1983	4590	70.0	150	63.6	180	70.3	141	90.0	-	-
	1984	4829	72.5	173	71.5	-	-	-	-	-	-
	1985	4716	69.8	150	61.0	185	69.8	-	-	-	-
	1986	4824	70.3	150	59.1	235	87.3	87	53.1	-	-
	1987	5049	72.5	174	67.6	208	75.8	90	54.4	-	-
	1988	4661	66.0	101	39.8	170	60.6	-	-	-	-
	1989	6336	88.9	105	40.9	162	57.4	90	54.5	-	-
	1990	4403	61.4	200	77.1	201	70.4	111	66.2	-	-
	1991	4436	61.0	196	73.8	210	72.5	102	59.4	-	-
	1992	4447	60.2	216	80.4	193	66.2	-	-	-	-
	1993	3696	49.3	206	75.7	244	83.1	101	56.4	-	-
	1994	3456	45.5	193	70.3	179	60.4	-	-	-	-
	1995	3556	46.3	154	55.8	178	59.8	60	32.6	25	30.9
	1996	3666	47.2	191	68.7	153	51.4	87	46.8	31	37.8
	1997	3542	45.2	184	65.7	156	52.3	66	35.0	10	12.0
	1998	3855	48.7	215	76.0	146	48.8	70	36.9	22	26.1
	1999	3861	48.4	144	50.5	169	56.2	130	68.0	18	21.1
	2000	3869	48.1	212	74.1	148	49.2	89	46.4	8	9.3

Table AIII.33. Number of laryngeal cancer (ICD-9: 161) deaths and crude mortality rates per 100,000 population for selected regions of Azerbaijan (1980-2000).

Site	*Year*	*Azerbaijan*		*Sumgayit*		*Ganja*		*Lenkoran*		*Astara*	
		N	CR	N	CR	N	CR	N	CR	N	CR
Larynx	1980	148	2.4	3	1.4	-	-	-	-	-	-
ICD-9: 161	1981	160	2.5	4	1.8	4	1.6	0	0.0	0	0.0
	1982	149	2.3	5	2.2	7	2.8	3	2.0	1	1.6
	1983	148	2.3	3	1.3	10	3.9	7	4.5	-	-
	1984	165	2.5	8	3.3	-	-	-	-	-	-
	1985	160	2.4	6	2.4	5	1.9	-	-	-	-
	1986	174	2.5	4	1.6	13	4.8	5	3.1	-	-
	1987	154	2.2	3	1.2	9	3.3	2	1.2	-	-
	1988	144	2.0	3	1.2	8	2.9	-	-	-	-
	1989	182	2.6	8	3.1	11	3.9	5	3.0	-	-
	1990	140	2.0	3	1.2	3	1.1	5	3.0	-	-
	1991	154	2.1	3	1.1	11	3.8	1	0.6	-	-
	1992	152	2.1	4	1.5	5	1.7	-	-	-	-
	1993	134	1.8	3	1.1	5	1.7	2	1.1	-	-
	1994	132	1.7	5	1.8	2	0.7	-	-	-	-
	1995	111	1.4	3	1.1	12	4.0	3	1.6	0	0.0
	1996	103	1.3	5	1.8	6	2.0	3	1.6	2	2.4
	1997	143	1.8	14	5.0	2	0.7	0	0.0	0	0.0
	1998	118	1.5	10	3.5	3	1.0	4	2.1	0	0.0
	1999	103	1.3	5	1.8	5	1.7	8	4.2	0	0.0
	2000	106	1.3	2	0.7	1	0.3	0	0.0	0	0.0

Table AIII.34. Number of trachea, bronchus, and lung cancer (ICD-9: 162) deaths and crude mortality rates per 100,000 population for selected regions of Azerbaijan (1980-2000).

Site	*Year*	*Azerbaijan*		*Sumgayit*		*Ganja*		*Lenkoran*		*Astara*	
		N	CR	N	CR	N	CR	N	CR	N	CR
Lung	1980	628	10.0	25	11.5	-	-	-	-	-	-
ICD-9: 162	1981	722	11.4	20	8.9	37	14.8	8	5.3	2	3.2
	1982	689	10.7	23	9.9	29	11.5	7	4.6	2	3.1
	1983	682	10.4	27	11.4	16	6.3	5	3.2	-	-
	1984	706	10.6	29	12.0	-	-	-	-	-	-
	1985	709	10.5	28	11.4	29	10.9	-	-	-	-
	1986	739	10.8	32	12.6	27	10.0	13	7.9	-	-
	1987	809	11.6	31	12.0	49	17.9	10	6.0	-	-
	1988	679	9.6	8	3.1	28	10.0	-	-	-	-
	1989	848	11.9	17	6.6	28	9.9	12	7.3	-	-
	1990	644	9.0	30	11.6	35	12.3	16	9.5	-	-
	1991	654	9.0	15	5.6	40	13.8	10	5.8	-	-
	1992	682	9.2	33	12.3	33	11.3	-	-	-	-
	1993	525	7.0	21	7.7	38	12.9	10	5.6	-	-
	1994	494	6.5	10	3.6	28	9.5	-	-	-	-
	1995	464	6.0	17	6.2	25	8.4	2	1.1	4	4.9
	1996	480	6.2	18	6.5	31	10.4	8	4.3	3	3.7
	1997	476	6.1	35	12.5	23	7.7	10	5.3	2	2.4
	1998	511	6.5	32	11.3	34	11.4	10	5.3	4	4.7
	1999	547	6.9	21	7.4	28	9.3	14	7.3	3	3.5
	2000	526	6.5	36	12.6	23	7.6	6	3.1	2	2.3

Table AIII.35. Number of urinary bladder cancer (ICD-9: 188) deaths and crude mortality rates per 100,000 population for selected regions of Azerbaijan (1980-2000).

Site	*Year*	*Azerbaijan*		*Sumgayit*		*Ganja*		*Lenkoran*		*Astara*	
		N	CR	N	CR	N	CR	N	CR	N	CR
Urinary Bladder	1980	153	2.4	7	3.2	-	-	-	-	-	-
ICD-9: 188	1981	138	2.2	9	4.0	3	1.2	0	0.0	1	1.6
	1982	134	2.1	6	2.6	4	1.6	2	1.3	1	1.6
	1983	136	2.1	7	3.0	6	2.3	2	1.3	-	-
	1984	170	2.6	7	2.9	-	-	-	-	-	-
	1985	152	2.2	4	1.6	3	1.1	-	-	-	-
	1986	144	2.1	4	1.6	4	1.5	4	2.4	-	-
	1987	138	2.0	6	2.3	5	1.8	0	0.0	-	-
	1988	96	1.4	3	1.2	2	0.7	-	-	-	-
	1989	152	2.1	1	0.4	5	1.8	1	0.6	-	-
	1990	118	1.6	4	1.5	12	4.2	1	0.6	-	-
	1991	111	1.5	5	1.9	3	1.0	1	0.6	-	-
	1992	114	1.5	8	3.0	4	1.4	-	-	-	-
	1993	84	1.1	3	1.1	2	0.7	0	0.0	-	-
	1994	85	1.1	4	1.5	2	0.7	-	-	-	-
	1995	101	1.3	10	3.6	1	0.3	1	0.5	1	1.2
	1996	98	1.3	11	4.0	3	1.0	1	0.5	1	1.2
	1997	95	1.2	7	2.5	5	1.7	2	1.1	0	0.0
	1998	110	1.4	16	5.7	1	0.3	2	1.1	2	2.4
	1999	98	1.2	4	1.4	7	2.3	1	0.5	2	2.3
	2000	96	1.2	6	2.1	9	3.0	1	0.5	0	0.0

Table AIII.36. Number of breast cancer deaths (ICD-9: 174, 175) deaths and crude mortality rates per 100,000 population for selected regions of Azerbaijan (males and females, 1980-2000).

Site	*Year*	*Azerbaijan*		*Sumgayit*		*Ganja*		*Lenkoran*		*Astara*	
		N	CR	N	CR	N	CR	N	CR	N	CR
Breast	1980	246	7.7	7	6.3	-	-	-	-	-	-
ICD-9: 174, 175	1981	295	9.1	11	9.5	19	14.8	4	5.2	2	6.2
	1982	332	10.0	13	11.0	19	14.6	4	5.1	2	6.0
	1983	316	9.4	15	12.4	16	12.2	4	5.0	-	-
	1984	304	8.9	7	5.6	-	-	-	-	-	-
	1985	357	10.3	15	11.9	25	18.4	-	-	-	-
	1986	376	10.7	6	4.6	22	15.9	5	5.9	-	-
	1987	399	11.2	18	13.6	21	14.9	3	3.5	-	-
	1988	384	10.6	10	7.7	24	16.7	-	-	-	-
	1989	473	13.0	8	6.1	21	14.5	5	0.0	-	-
	1990	492	13.4	30	22.6	28	19.1	6	0.0	-	-
	1991	404	10.9	10	7.4	14	9.5	5	5.7	-	-
	1992	423	11.2	17	12.4	23	15.4	-	-	-	-
	1993	295	7.7	10	7.2	18	12.0	9	9.8	-	-
	1994	137	3.5	10	7.2	22	14.6	-	-	-	-
	1995	332	8.5	9	6.4	12	7.9	3	3.2	4	9.7
	1996	298	7.6	15	10.6	16	10.6	1	1.1	2	4.8
	1997	345	8.7	12	8.4	22	14.6	4	4.2	2	4.7
	1998	387	9.6	0	0.0	22	14.4	2	2.1	2	4.7
	1999	414	10.1	13	8.9	20	13.0	22	22.5	3	6.9
	2000	384	9.3	17	11.6	22	14.3	9	9.2	0	0.0